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Eastern Region Design Office

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SUBJECT: SR-270, OL - 3502
Pullman to Moscow Realignment Project
Final Geotechnical Recommendations for Grading

Please find a geotechnical report attached for the subject project. If you have any questions then please contact James Struthers at (360) 709-5409 or Tom Badger at (360) 709-5461.

TMA:jrs

Attachments as stated

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Geotechnical Report

Pullman to Idaho State Line

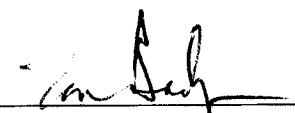
SR 270, XL-3502

Whitman County, Washington

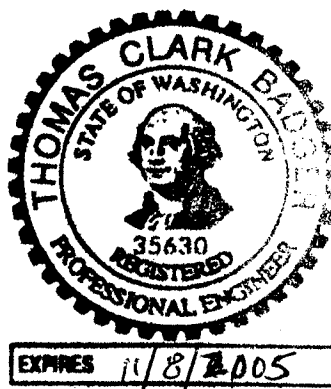




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TABLE OF CONTENTS

INTRODUCTION	1
PROJECT OVERVIEW	1
REGIONAL SETTING	1
SITE PHYSIOGRAPHY	1
REGIONAL GEOLOGY	2
GEOTECHNICAL INVESTIGATION	2
FIELD EXPLORATION	3
GEOLOGIC RECONNAISSANCE	3
DRILLING PROGRAM	3
TEST TRENCHING	4
GEOPHYSICAL SURVEY	4
LABORATORY TESTING	4
PROJECT SITE GEOLOGY	4
GEOLOGIC UNITS	4
LOESS (QL)(PLEISTOCENE TO HOLOCENE)	4
COLUMBIA RIVER BASALT (MV)(MIOCENE)	5
ROCK-MASS STRENGTH	5
GROUNDWATER CONDITIONS	5
ANTICIPATED GEOLOGIC CONDITIONS ALONG PROJECT ALIGNMENT	6
MAINLINE STATION 80+00 TO 97+00	6
MAINLINE STATION 97+00 TO 109+00	6
MAINLINE STATIONS 109+00 TO 124+00	6
MAINLINE STATIONS 124+00 TO 127+00	6
MAINLINE STATIONS 127+00 TO 137+50	6
MAINLINE STATIONS 137+50 TO 144+00	7
MAINLINE STATIONS 144+00 TO 148+00	7
MAINLINE STATIONS 148+00 TO 156+00	7
MAINLINE STATIONS 156+00 TO 185+00	7
MAINLINE STATIONS 185+00 TO 189+50	7
MAINLINE STATIONS 189+50 TO 198+50	7
MAINLINE STATIONS 198+50 TO 203+00	7
MAINLINE STATIONS 203+00 TO 213+00	8
MAINLINE STATIONS 213+00 TO 246+00	8
MAINLINE STATIONS 246+00 TO 265+00	8

MAINLINE STATIONS 265+00 TO 273+00	8
MAINLINE STATIONS 273+00 TO 276+00	8
MAINLINE STATIONS 276+00 TO 305+00	8
MAINLINE STATIONS 305+00 TO 314+00	9
MAINLINE STATIONS 314+00 TO 324+00	9
MAINLINE STATIONS 324+00 TO 334+00	9
MAINLINE STATIONS 334+00 TO 343+00	9
MAINLINE STATIONS 343+00 TO 360+00	9
MAINLINE STATIONS 360+00 TO 371+50	9
MAINLINE STATIONS 371+50 TO 394+85	10

CONCLUSIONS AND RECOMMENDATIONS **10**

USE OF EXCAVATION MATERIALS IN CONSTRUCTION	10
WASTE	10
ROADWAY EXCAVATION	11
CUT SLOPE DESIGN AND CONSTRUCTION	12
SOIL CUT SLOPES	12
ROCK CUT SLOPES	12
COMPOUND CUTS IN SOIL AND ROCK	13
EMBANKMENT DESIGN AND CONSTRUCTION	13
GENERAL	13
CULVERT DESIGN AND CONSTRUCTION	14

GEOTECHNICAL INSTRUMENTATION AND TEST HOLE ABANDONMENT **15**

SUMMARY OF GEOTECHNICAL CONDITIONS **15**

LIMITATIONS **15**

REFERENCES **15**

TABLES

Table 1 – Summary of Borehole Data
Table 2 – Summary of Groundwater Data
Table 3 – Summary of Basalt Point Load Test Data
Table 4 – Summary of Aggregate Quality Testing Data
Table 5 – Design Cut and Fill Slope Recommendations

FIGURES

Figure 1 – Vicinity Map
Figure 2 – Proposed Grading– Mainline SR 270

Figure 3 – Photographs of General Site Conditions

Figure 4 – Seepage Control Detail

APPENDICES

Appendix A – Boring Logs

Appendix B – Laboratory Test Results

Appendix C – Geophysical Survey Report

INTRODUCTION

At the request of the Eastern Region Design Office, the EEP Geotechnical Division has conducted a geotechnical investigation for the Johnson Road to Idaho State Line Safety Improvements Project on SR-270, near Pullman, Washington. The location of the project is shown in Figure 1. The purpose of this investigation was to characterize surface and subsurface conditions present along the project alignment and to determine the impacts of these conditions on the design and construction of grading for this project.

The following sections provide a summary of methods employed during our evaluation and conclusions derived from our work. This report should be made available to prospective bidders and the Contractor in accordance with Section 1-02.4 (2) of the WSDOT Standard Specifications.

PROJECT OVERVIEW

The proposed project involves widening of the existing two-lane highway. The widening includes additional roadway section to the immediate north and localized realignment of both lanes to the north of the existing highway. Associated with this widening and realignment is the creation of new ditchwork for both stormwater control and rockfall protection. The proposed alignment for the widening and realignment of the mainline is shown in Figures 2A through 2I. The initially proposed project plan called for complete realignment a significant distance to the north of the existing highway, construction of an array of frontage roads, several stream crossings, and construction of an interchange. It is our understanding that these project items have been dropped from further consideration in lieu of the less expensive option of widening to the immediate north of the existing facility (presented herein). Accordingly, design recommendations for these previously considered design options are not included in this report. For reference, data generated for design consideration of these options is included.

Construction of additional roadway section to the north of the existing SR 270 will require cuts that locally exceed 70 feet in height and embankments as high as 25 feet. Based on our understanding of site conditions, these cuts will expose a variable thickness of clayey loess soils overlying basaltic bedrock. As a result, compound cuts will locally be required to establish stable slopes.

REGIONAL SETTING

Site Physiography

The project area is dominated by rolling hills developed in loess soils. The proposed highway lies on the north side of a shallow valley occupied by Paradise Creek. Paradise Creek is a low sinuosity, meandering stream that is typically less than 30 feet in width. The stream channel is mildly incised (less than 10 feet) below the streams' alluvial plain.

Precipitation in the project area increases toward the east, due to the presence of nearby mountains. Mean annual precipitation is about 20 to 22 inches. The majority of the area is farmland used for the production of winter wheat with occasional and isolated light industrial facilities. Vegetation in non-agricultural or fallow areas consists primarily of mixed field grasses and isolated stands of scrub brush that increase in abundance near the river (Figure 3).

Regional Geology

The project is located in the Pullman-Moscow Basin, an area bounded by mountains to the north, south, and east. In this basin, basalt bedrock is overlain by wind-blown clayey silt deposits (loess) that vary considerably in thickness. Basalt bedrock consists of relatively flat lying flows of the Miocene Columbia River Basalt Group, specifically the Wanupum Basalt. This geologic unit is regionally widespread and demonstrates considerable variation in fracture characteristics, weathering, and degree of alteration, depending on its cooling history and other local condition during flow deposition. Although not observed within the project limits, sedimentary interbeds are often present between individual basalt flows (Gulick, 1994).

Loess deposits that overlie the basalt bedrock are Pleistocene to Holocene in age and are part of an extensive dune complex that is present throughout southeast Washington. In the vicinity of Pullman and Moscow, this loess is typically clayey silt. This deposit is locally in excess of 200 feet in thickness (Schuster and others, 1997).

GEOTECHNICAL INVESTIGATION

The geotechnical investigation for the project consisted of the following elements:

- Review of pertinent geologic maps and reports for the area,
- Review of air photos for the site,
- Site reconnaissance and surface mapping of geologic units,
- Subsurface investigation of proposed cut and fill areas to generate information regarding soil and rock characteristics,
- Seismic refraction survey at selected locations along the project corridor to constrain bedrock geometry,
- Test trenches to identify unsuitable foundation soils at selected locations, and,
- Laboratory testing of selected soil and rock samples collected during the field investigation to characterize material types and geotechnical characteristics.

The following sections present details of our geotechnical investigation and data obtained during our work.

Field Exploration

Geologic Reconnaissance

Geologic reconnaissance for this project was conducted during separate field visits in Spring of 2001 and Fall of 2003. This work consisted of mapping and geologic characterization of existing rock outcrops and road-cut exposures. Observations of rock-mass conditions, discontinuity conditions, and overburden thickness were made at that time. During the geologic reconnaissance work, the presence of groundwater seepage in cut slopes, if present, was noted.

Drilling Program

A total of 72 boreholes were advanced within the project area to collect subsurface information and allow characterization of soil and rock units. Two phases of drilling were conducted for this project; one in fall 2001 for the procurement of right of way and a second phase of drilling in winter of 2003 to 2004 to generate design data. Table 1 provides information on the depth, location, and installed instrumentation for each boring. Borings were located to collect subsurface information along the proposed alignment. The locations of boreholes are shown in Figures 2A through 2I. Logs of the borings are presented in Appendix A.

Borings were advanced by WSDOT drill crews using wet rotary methods with an HW casing advancer/HQ triple tube coring system. Generally, Standard Penetration Tests were performed at five-foot intervals when advancing the test hole through soil. Relatively undisturbed samples were collected at selected intervals and retained for additional laboratory testing. Where encountered, bedrock was cored using HQ triple-tube equipment.

During drilling, samples were collected and a WSDOT drill inspector, under guidance from a WSDOT engineering geologist, logged drilling conditions. Descriptions of subsurface soil and rock encountered, groundwater conditions, relative soil density, and borehole completion was noted during drilling operations. Following drilling, samples were reviewed for consistency with the field descriptions. At that time, samples were selected for laboratory testing.

Standpipe piezometers were installed in selected borings to collect information on the occurrence of groundwater within the project area. These piezometers were constructed of 1-inch diameter PVC pipe. Each standpipe piezometer was equipped with a slotted section to allow water to enter the piezometer. Details of the piezometer installations are contained on the boring logs in Appendix A. Following installation, depth to water readings were collected in each of the piezometers. This groundwater information is summarized in Table 2 and on the boring logs in Appendix A.

Test Trenching

A total of eleven test trenches were completed along the length of the alignment as part of this study. The purpose of these test trenches was to determine the thickness of potential unsuitable foundation soils in proposed embankment areas and to document subsoil conditions in the vicinity of proposed culvert under-crossings. Test trenches were excavated using a WSDOT -upplied Case 9020 excavator. Soils encountered during test trenching were logged by a WSDOT drilling inspector under supervision from a WSDOT engineering geologist. The locations of the test trenches are shown on Figures 2A through 2I. Logs of the test trenches are presented in Appendix A.

Geophysical Survey

Under contract to WSDOT, Golder Associates conducted seismic refraction surveys at fifteen locations. The approximate locations of the geophysical lines are shown in Figures 2A through 2I. Detailed methodologies employed during the survey and survey results are presented in Appendix C.

Laboratory Testing

Laboratory testing was performed on selected soil samples for the purposes of classification and to aid in evaluation of pertinent engineering soil and rock properties. Natural moisture contents, sieve analyses, consolidation, triaxial shear, aggregate quality tests, and Atterberg Limit tests were conducted by WSDOT. Northwest Geotech, Inc. conducted hydrometer analyses. Laboratory testing was performed in general accordance with appropriate American Society of Testing and Materials (ASTM) and American Association of State Highway and Transportation Officials (AASHTO) test methods. Laboratory test results are attached as Appendix C. In addition, point load tests were conducted on rock samples collected during drilling to estimate uniaxial compressive strength. The results of the point load tests are summarized in Table 3.

PROJECT SITE GEOLOGY

Geologic Units

Subsurface conditions within the project area are dominated by the presence of wind-blown loess deposits that overlie basaltic bedrock. In lower-lying areas of the project, loess has been variably reworked within drainages and by slope processes. The following geologic units were identified during subsurface exploration and literature review.

Loess (Ql)(Pleistocene to Holocene)

Wind-blown loess deposits were encountered throughout the project area. These deposits consist predominately of light brown, soft to stiff silty clay. Loose to medium-dense silt with sand, and soft to stiff silty clay with sand are also represented within this unit. In borings

conducted during subsurface exploration, the thickness of this deposit ranged from negligible to in excess of 75 feet. Observed moisture contents ranged from 15 to 37 percent, with typical moisture contents between 20 to 25 percent. Plasticity indices for samples tested typically range from 7 to 20. Locally, this unit has been reworked by minor streams and slope processes. Where present, the re-worked loess contains significant amounts of organic debris.

Columbia River Basalt (Mv)(Miocene)

Bedrock at the project site consists of dark grey to black basalt. Where exposed in outcrop, this basalt bedrock is typically slightly to moderately weathered and moderately strong to strong with localized zones of more intense weathering and vesiculation. Discontinuity spacing varies from 2 feet to less than 6 inches. Discontinuities are general not persistent over distances greater than 2 feet. Discontinuity surfaces are typically clean and hard with localized infilling silt, particularly in the upper several feet of the unit.

Rock Quality Designator (RQD) values from borings range between 0 and 100 percent, with an average value of 52 percent. RQD represents the percent of core length composed of intact pieces greater than four inches in length. Fracture frequency from borings is also highly variable with an average fracture frequency of 7 fractures per foot. Unconfined compressive strength of intact rock samples was estimated through point load testing of core from along the alignment length. Table 3 presents a summary of this point load test data. Estimated unconfined compressive strength values range from 9,500 psi to 39,500 psi with typical values between 21,000 and 38,000 psi. Seismic velocities in the basalt are estimated to be between 7,030 and 17,900 feet per second.

Rock-mass Strength

Rock-mass strength used in stability analysis for this project was estimated using the empirical Hoek-Brown failure criteria for rock-mass strength (Hoek and Brown, 1988, 1997). This methodology establishes a non-linear strength envelope for a given rock mass based on the unconfined compressive strength of the intact rock and the field quality of the rock (fracture frequency, infilling, degree of weathering, etc.). For this project, rock-mass quality was estimated using the RMR system published by Bieniawski (1974).

Based on typical rock conditions anticipated within the cut areas, a typical RMR value of 63 was determined. This rock quality rating corresponds to input values for the Hoek-Brown strength envelope of $m = 1.395$ and $s = 0.00293$.

Groundwater Conditions

Groundwater conditions throughout the project vary considerably with respect to topography, bedrock conditions in the subsurface, and proximity to Paradise Creek. Depth to groundwater, as recorded in piezometers installed for this project, is presented in Table 2. Generally, groundwater occurs as a unconfined aquifer within the loess. As the loess is underlain by basaltic bedrock in areas of proposed cuts, depth to bedrock varies considerably and is documented at depths ranging from less than 5 feet to greater than 45 feet below the

ground surface. The following sections provide more specific information as to the anticipated geologic conditions and occurrence of groundwater for each of the proposed cut and embankment areas for the project.

Anticipated Geologic Conditions Along Project Alignment

Mainline Station 80+00 to 97+00

In this section, cuts up to 25 feet in height are proposed to the north of the existing facility. Based on the subsurface conditions encountered in Borings H-1-04 and H-5-01, we anticipate that the western portion of this cut will encounter clayey loess deposits and transition into moderately strong, intact basalt in the vicinity of Station 91+00 to 92+00. Groundwater was not encountered in either of these borings.

Mainline Station 97+00 to 109+00

This section of the alignment will require relatively minor cuts and embankment sections on the order of less than 5 to 10 feet in height. Based on surface observations and material exposed in the roadway cuts, we anticipate that this grading involves minor cuts in clayey loess soils. The presence of groundwater is not anticipated to be an issue within this section.

Mainline Stations 109+00 to 124+00

From Station 109+00 to 124+00, cuts up to 40 feet in height are proposed to the north of the existing facility. Based on the subsurface data from Borings H-02-03 and H-3-03, we anticipate that these cuts will be primarily in moderately strong basalt with closely spaced fractures. The upper portion of these cuts will likely expose clayey loess soils in the upper five feet. Although groundwater is not anticipated in the overlying loess, piezometer data suggests that groundwater may potentially be encountered in the basalt.

Mainline Stations 124+00 to 127+00

Embankments up to 20 feet in height are proposed for this portion of the alignment. Based on the subsurface data from Borings H-04-03 and H-05-03, we anticipate that embankments will be constructed on loess soils that are shallowly underlain by basalt bedrock.

Mainline Stations 127+00 to 137+50

Cuts to 50 feet in height will be required to accommodate this portion of the mainline alignment. Based on the subsurface data from Borings H-5-03, H-06-01, H-6-03 and Seismic Line SL-6, we anticipate that these cuts will encounter basalt bedrock between with up to 8 feet of loess soil cover. Based on the available data, we do not anticipate that groundwater will be encountered during grading operations within this section.

Mainline Stations 137+50 to 144+00

Between Stations 137+50 and 144+00, cuts and fills less than 10 feet in height are proposed. We anticipate that cuts will encounter loess soils.

Mainline Stations 144+00 to 148+00

Cuts up to 20 feet in height are proposed for this segment. Based on site observations, we anticipate that these relatively shallow cuts will encounter loess soils.

Mainline Stations 148+00 to 156+00

Within this section of the realignment, cuts up to 50 feet in height will be required during construction. Data from Borings H-9-03, H-10-03, H-7-01, and Seismic Lines SL-8, suggest that these cuts will encounter basalt bedrock with less than five feet of loess cover. Data from piezometers installed in this section identify the presence of groundwater within the basalt bedrock.

Mainline Stations 156+00 to 185+00

Between Stations 156+00 and 185+00, cuts and fills less than 10 feet in height are proposed. We anticipate that cuts will encounter loess soils.

Mainline Stations 185+00 to 189+50

Cuts up to 30 feet in height are proposed this section of the project. Based on the data from surface observations, Boring H-15-03 and Seismic Line SL-9, we anticipate that cuts will encounter basalt bedrock overlain with a 5 to 10 foot thickness of loess. We do not anticipate that groundwater will be encountered during construction of these cuts.

Mainline Stations 189+50 to 198+50

Cuts and fills less than 10 feet in height are proposed for this section of the project. We anticipate that cuts will encounter loess soils.

Mainline Stations 198+50 to 203+00

Cuts up to 30 feet in height are proposed for to accommodate widening to the north in this section of the project. Based on the information from Borings H-19-03 and H-20-03, we anticipate that these cuts will encounter clayey silt loess to the elevation of the proposed grade. As this loess is shallowly underlain by basalt bedrock, localized areas of high soil moisture and seepage may be encountered during grading.

Mainline Stations 203+00 to 213+00

Cuts up to 75 feet in height will be required for this portion of the project. Data from surface observations and Borings H-20-03 and H-21-03 suggest that these cuts will encounter basalt bedrock overlain by a variable thickness of clays silt loess. We anticipate that loess in this section will range between 15 to 25 feet in thickness at the location of the proposed cut face.

Mainline Stations 213+00 to 246+00

Within this portion of the project, the alignment crosses what is currently a quarry floor. The proposed alignment calls for limited cuts and fills less than 10 feet in height. In this section, basalt is locally exposed at the surface. Cuts will be in a combination of basalt and reworked material (silty gravel) associated with the quarry operations.

Mainline Stations 246+00 to 265+00

Cuts up to 30 feet in height will be required within this section of the project. This section includes a former quarry used by WSDOT for basalt aggregate. Based on surface observations and data from Borings H-24-03 through H-30-03, we anticipate that cuts within this section will encounter basalt bedrock overlain by less than 5 feet of loess. Groundwater is anticipated to be below the grade of the proposed alignment.

Mainline Stations 265+00 to 273+00

Cuts and fills less than 10 feet in height are proposed for this section of the project. We anticipate that cuts will encounter loess soils.

Mainline Stations 273+00 to 276+00

Cuts up to 25 feet in height will be required for this portion of the project. Data from Boring H-31-03 suggests that these cuts will be in clayey silt loess. Piezometer data from borings to the east suggests that groundwater may be encountered in this area at a depth of less than 10 feet.

Mainline Stations 276+00 to 305+00

Cuts up to 45 feet in height are proposed in this section. Based on data from Borings H-32-03, H-33-03, H-34-03, and H-35-03, we anticipate that these cuts will be in basalt bedrock that is overlain by less than 5 feet of clayey silt loess. Water level data from these borings also suggests that groundwater occurs within the basalt above the grade finished roadway surface. Although seepage is not anticipated to impact the long-term stability of the cut slope, the Contractor should be prepared to deal with groundwater during grading operations.

Mainline Stations 305+00 to 314+00

Cuts and fills less than 10 feet in height are proposed for this section of the project. We anticipate that cuts will encounter loess soils.

Mainline Stations 314+00 to 324+00

Embankments up to 20 feet in height are proposed for this section. Data from Borings H-36-03 through H-39-03 and Test Trench TP-2 indicate that this area is underlain by between 5 and 15 feet of loess overlying basalt bedrock. Piezometer data indicates that groundwater lies within 5 feet of the ground surface.

Mainline Stations 324+00 to 334+00

Cut slopes up to 40 feet in height are proposed for this segment of the project. Based on data from Borings H-10-01 and H-40-03 and from Seismic Lines SL-14 and SL-15, we anticipate that these cuts will encounter loess soils overlying bedrock. The thickness of loess anticipated in this section ranges from 15 to approximately 40 feet. Groundwater was not observed in the piezometer installed in Boring H-40-03.

Mainline Stations 334+00 to 343+00

Embankments up to 15 feet in height are proposed for this section of the project. Data from Boring H-42-03, H-42-03, H-44-03, and Test Trenches TP-3 through TP-7 indicate that this area is underlain by soft, fine-grained soils that locally contain a high percentage of organic debris. Preparation of embankment foundations will likely encounter this unsuitable soil. Recommendations for excavation and removal of unsuitable soil are presented below. This deposit is approximately 15 feet in thickness.

Mainline Stations 343+00 to 360+00

In the vicinity of Airport Road, embankments less than 10 feet in height will be required to accommodate widening to the north of the existing facility. Test trenches TP-8 through TP-11 and Boring H-46-03 indicate that this area is underlain by soft, saturated soils with a high organic content. Preparation of embankment foundations will likely encounter this unsuitable soil. Recommendations for excavation and removal of unsuitable soil are presented below. Groundwater within this section was encountered within 5 feet of the surface.

Mainline Stations 360+00 to 371+50

Cuts up to 30 feet in height will be required for this portion of the alignment. Based on data from Boring H-47-03, we anticipate that cuts in this section will encounter basaltic bedrock overlain by approximately 15 feet of loess. Groundwater is not anticipated at elevations above the proposed alignment.

Mainline Stations 371+50 to 394+85

Cuts and fills less than 10 feet in height are proposed for this section of the project. We anticipate that cuts will encounter loess soils.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our field investigation and laboratory testing, the major geotechnical issues associated with design and construction of the project are as follows:

- Use of excavated material in construction
- Cut slope design and construction
- Embankment design and construction
- Culvert design and construction
- Groundwater and seepage control

The following sections present recommendations pertinent to the above-identified geotechnical issues for the project.

Use of Excavation Materials in Construction

During the grading for the project, cuts up to about 75 feet in height will be created. Excavation materials for these cuts will be a combination of clayey silt, clay and basalt bedrock. In addition, material will be generated during clearing, grubbing, and site preparation in advance of embankment construction. Based on our conversations with the Eastern Region Design Team, it is our understanding that current plans call for reuse of soils generated during cuts for construction of embankments and that the project will generate excess materials as a result of grading. Based on this assumption, and our current understanding of materials in the proposed cut sections, excavated materials have been divided into the following categories with respect to reuse of excavation soils in construction:

- 1) Waste
- 2) Roadway Excavation

Waste

Waste is defined as materials that, based on our geotechnical investigation, laboratory testing, and experience, cannot be placed as embankment fill in a manner that results in adequate strength and settlement characteristics using reasonable and accepted construction practices. In cuts for this section of the project, waste material will include wet soils and soils containing organic material and wood debris, such as those generated during clearing and grubbing operations for the project. Such materials should be transported offsite to a suitable disposal area or stockpiled locally for later use in landscaping and/or non-structural fills. Based on actual field conditions, wet soils may be reevaluated for use in embankment construction

pending the approval of the E&EP Geotechnical Division. Consideration should be given to providing a site for disposal of material.

Roadway Excavation

Roadway excavation materials for this grading project include basaltic bedrock and fine-grained loess soils. The following sections describe issues pertinent to the reuse of these excavation products in embankment construction.

Soil

Fine-grained loess soils present within the roadway excavation prism are typically plastic and do not meet the minimum requirements for common borrow as described in WSDOT Standard Specification 9-03.14(3). However, past success in using this soil for embankments in the vicinity of the project area indicate that it may be used to construct embankments of moderate height (<40 feet), provided certain proactive measures are taken in design and construction.

Data from subsurface investigation and laboratory testing indicates that much of the fine-grained soil encountered during excavation will likely be significantly above the optimum moisture content required for compaction. Accordingly, if used, the soils will need to be moisture conditioned (e.g. farmed, aerated) prior to placement as fill. We strongly recommend that a test-embankment be constructed prior to initiation of the bulk of the earthwork so that methods and means of moisture conditioning and compacting can be developed and their effectiveness verified.

Loess soils are highly erosive in nature. Exposure of unprotected embankment side slopes to precipitation or concentrated overland flow (e.g. from storm water or natural drainages) can result in rapid, large-scale rilling, gullyng, or failure of embankment side slopes. We recommend that erosion control measures for embankment side slopes be both aggressive in nature and rapidly implemented following construction. Consideration should be given to placing erosion protection sequentially, as embankment sections are completed along the length of the alignment.

Based on past experience, even in a compacted state, the loess soils are anticipated to have poor properties for the support of the structural pavement section. This characteristic will be exaggerated by potential high moisture content in the compacted subgrade soils. During construction, repeated wheel loads from earthwork equipment and haul trucks could cause pumping and weakening of the subgrade. We recommend that the Olympia Service Center Pavement Structures group (Jeff Uhlmeier) be consulted to provide recommendations for the design of both temporary haul roads for construction as well as a structural pavement section that both provides drainage and considers the anticipated low stiffness of the proposed embankment materials.

Basalt

Aggregate quality testing of basalt in proposed cut areas was conducted to confirm potential reuse of the excavation material during construction. The results of this testing are summarized in Table 4. Also summarized in Table 4 are WSDOT standards for various aggregate products. These test results show that, generally, the basalt bedrock encountered in the major cut areas is of high quality and suitable for a wide variety of uses on the project including crushed aggregate for hot mix asphaltic concrete.

Cut Slope Design and Construction

Soil Cut Slopes

Soil cut slopes for the project will be less than 40 feet in height and will be constructed in unconsolidated clayey loess. Based on field and laboratory data, stability analysis, and experience, slopes exposed in the proposed cuts are anticipated to be stable at an inclination of 2.5H : 1V or flatter. This slope orientation is consistent with the recommendations of Higgins and Fragazy (1988).

Ground water, high moisture soil moisture, and/or seepage may be encountered in proposed cuts. When springs or seeps are encountered that may cause a long-term problem with cut slope erosion and sloughing, it is recommended that the location of the spring or seep down to the ditch line be excavated a minimum of two feet into the cut face and backfilled, starting at the bottom, with quarry spalls that meet Standard Specification 9-13.6 to provide a rock-filled channel for seepage control. To minimize the potential for migration of soil through the rock, a Class B, moderate survivability, permanent erosion control geotextile should be installed between the native soils and quarry spalls. When practical, the excavation should be benched to provide a stable surface for the geotextile installation. In addition, the geotextile should be secured at its upslope extent in a one to two foot deep trench to provide additional securement. The upslope trenching and securement should take place following the placement of all the quarry spalls to avoid tearing of the geotextile (Figure 5).

Due to the erosive nature of loess soils to be exposed in cuts, we recommend that measures be taken to control erosion on newly formed cut slopes (Higgins and Fragazy, 1988). Such measures should include both short-term and long-term strategies for erosion management, possibly through the use of matting and designed revegetation of the slopes. Olympia Service Center specialists in erosion control planning (Scott Carey) should be contacted to initiate the design of such a plan. In addition, we recommend that the tops of cut slopes be graded so that surface drainage is not conveyed directly on the cut face. Properly designed brow ditching may be an efficient method of intercepting surface flows from upslope and routing them to the nearest stormwater control facility.

Rock Cut Slopes

Rock cuts for the project will be less than 50 feet in height and will be constructed in basalt bedrock. Although some degree of variation can be expected in the quality of rock from cut

to cut, we anticipate that cuts in basalt will be stable at the proposed inclination of $\frac{1}{2}$ H : 1 V or flatter. Rock cuts with inclination of 0.5H : 1 V should be excavated using controlled blasting methods in accordance with WSDOT Standard Specification 2-03.3(2); flatter slopes will not require controlled blasting

In areas where 0.5H : 1 V rock cuts are proposed, rockfall containment ditches will be required; flatter rock cuts may utilize a standard ditch section. We recommend that, for this project, a Stage 1 rockfall ditch (Design Manual 640-16a) be used. This ditch configuration calls for separation of the rock cut from the usable shoulder of the roadway with a 1 H : 6 V inclined ditch of varying width. The width of the ditch should be selected based on the guidance provided in the table on Design Manual p. 640-16a.

Piezometer data indicates that groundwater will be encountered during construction of cuts in basalt (See above discussion of *Anticipated Grading Conditions Along Project Alignments*). The contractor should be equipped to deal with anticipated groundwater conditions during blasting and debris removal activities.

Compound Cuts in Soil and Rock

Cuts involving both soil and rock will be required for this project. The overlying soil slopes should be planned and constructed for an inclination of $2 \frac{1}{2}$ H : 1 V or flatter, and the underlying rock slope should be planned and constructed for an inclination of $\frac{1}{2}$ H:1 V or flatter. For cut conditions where less than 15 feet of rock will be exposed in the base of a cut, the entire cut should be planned and constructed for a $2 \frac{1}{2}$ H : 1 V or flatter slope inclination.

For slope staking of compound cuts, we recommend the initial slope stakes be placed at the proposed rock cut inclination. The contractor should then excavate down to the rock contact at a temporary slope of 1H:1V. Once the rock contact is located, then slope stakes can be placed upslope at the recommended soil inclination and the contractor can lay the overburden soils back.

Embankment Design and Construction

General

Embankments for the project will be less than 25 feet in total height. We anticipate that these embankments will be constructed from the silty clay materials generated during grading of other portions of the project. Based on field and laboratory data and on stability analysis, proposed embankments are anticipated to be stable at an inclination of 3H :1V or flatter.

Note that, as discussed under material reuse, fine-grained soils encountered during creation of cuts will likely be above optimum moisture content for compaction in embankments. If loess soils are used in embankment construction, these soils will need to be moisture-conditioned by aeration or land-farming prior to placement as fill.

Prior to placement of embankment material on existing side slopes, we recommend that foundation areas be prepared using side-hill terracing, as described in WSDOT Standard Specification 2-03.3(14) for all natural slopes exceeding a 5H : 1V cross-slope. All soils excavated for side-hill terracing should be treated as waste.

Based on the available data, we anticipate that settlement of the proposed embankments will be 3 inches or less. Due to the generally low-plasticity nature of the silty clay soils and the relatively small thickness of soil beneath the proposed embankments, we anticipate that the majority of this settlement will occur during or shortly following construction.

Note that soft organic soils were encountered in borings and test trenches between Stations 334+00 to 343+00 and Stations 343+00 and 360+00. Based on the available data, we anticipate that the presence of these organic soils will be localized in nature and extend to up to 5 feet in depth. The thickest accumulations of these soils will likely be encountered between Stations 341+00 and 353+00. Although embankment heights in this area are relatively modest, this organic soil should be treated as unsuitable for embankment foundations. Accordingly, we recommend that unsuitable soils be excavated and removed to firm subgrade soils prior to construction of the embankments. Unsuitable material removed from the embankment foundation area shall be treated as waste. Based on an average depth of removal of three feet, we estimate that approximately 5,000 to 8,000 cubic yards of unsuitable soil may be encountered. If further definition of these estimated quantities is required by the Design Team, we recommend delineation of soft soil areas using hand-augered borings. This work could be coordinated either through Eastern Region Materials or this office.

Following removal of unsuitable foundation soils, construction of the embankment base and construction working surface shall be performed in accordance with WSDOT Standard Specification 2-03.3(14). Note that, if construction takes place in the dry summer months, placement of loess embankment soils immediately following foundation soil preparation will likely be feasible. If construction occurs during wet weather conditions, a working base of quarry spalls underlain by a separation geotextile will likely be required. We recommend a minimum 12 inch thickness of quarry spalls and a Class B, high survivability, non-woven, permanent erosion control geotextile be used in this application (WSDOT Standard Specification 9-33.2).

Culvert Design and Construction

Proposed project plans call for installation of two 9-foot diameter pipe culverts. These culverts are located at approximate Station 103+00 and 322+30. Data from Test Trenches TP-1 and TP-2 indicate that bedrock will be encountered at relatively shallow depths at both of these locations. In the vicinity of Station 103+00, bedrock was encountered at a depth of 7 feet below ground surface and in the vicinity of Station 322+30, bedrock was encountered at a depth of 5 feet below ground surface. During culvert construction, rock excavation will be required to a depth sufficient to allow for pipe bedding. We recommend that pipe bedding be adequate in thickness to distribute potential point loading associated with irregularities in the excavated bedrock. We anticipate that a minimum 1 foot thickness of pipe bedding will be required for pipe bedding.

GEOTECHNICAL INSTRUMENTATION AND TEST HOLE ABANDONMENT

All test borings with open standpipe piezometers will need to be decommissioned in accordance with WAC 173-160 (Table 1). A Washington State Licensed Driller must perform all decommissioning work. This decommissioning work can be included as part of the Contractor's work under contract, or completed prior to construction by WSDOT crews. Should the Region wish to pursue piezometer decommissioning in advance of construction, we recommend that they contact Frank Curry (WSDOT Drilling Services Supervisor) at 360-709-5464 to schedule this work.

SUMMARY OF GEOTECHNICAL CONDITIONS

A "SUMMARY OF GEOTECHNICAL CONDITIONS" has been provided in Appendix D of this report. This "SUMMARY OF GEOTECHNICAL CONDITIONS" must be included in the contract document.

LIMITATIONS

This report has been prepared to assist the Eastern Region Design Team in the engineering design of the Pullman to Idaho State Line Project and should not be used, in part or in whole for other purposes without contacting the E&EP Geotechnical Branch for a review of the applicability of such reuse.

The conclusions and recommendations contained in this report are base of the Geotechnical Branch's understanding of the project at the time that the report was written and on site conditions that existed at time of the field exploration. If significant changes to the nature, configuration, or scope of the project occur during the design process, the Geotechnical Branch should be consulted to determine the impact of such changes on the recommendations and conclusions presented in this report.

If the project plans are changed, or if during construction, site conditions are different from those observed during field explorations, or appear to be different beneath of beyond the project limits, the Geotechnical Division should be advised so that we can assist in evaluating the impact of these changed conditions on the project design and implementation.

If there are any questions regarding the recommendations contained in this geotechnical report then please contact James Struthers at (360) 709-5409 or Tom Badger at (360) 709-5461.

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Table 1 **Summary of Borehole Data**
Pullman to Idaho State Line
SR-270

Boring Number	Elevation	Northing	Easting	Depth	Instrumentation
H-01-01	2,597	855,787	2,815,823	78.5	None
H-01-04	2,411	852,406	2,808,495	25.0	Piezometer
H-02-01	2,580	855,526	2,815,463	80.0	None
H-02-03	2,463	852,419	2,810,883	60.0	None
H-03-01	2,556	859,212	2,832,129	25.0	None
H-03-03	2,465	852,410	2,811,189	61.5	None
H-04-01	2,573	858,895	2,832,716	35.0	None
H-04-03	2,443	852,461	2,811,956	49.5	None
H-05-01	2,523	852,473	2,808,891	30.0	None
H-05-03	2,460	852,495	2,818,056	40.0	None
H-06-01	2,491	852,629	2,812,450	45.0	None
H-06-03	2,476	852,462	2,812,670	45.0	Piezometer
H-07-01	2,516	853,713	2,814,503	70.0	None
H-07-03	2,494	852,781	2,812,923	50.0	Piezometer
H-08-01	2,574	854,681	2,815,097	38.5	None
H-08-03	2,470	853,122	2,813,808	50.0	None
H-09-01	2,520			65.0	None
H-09-03	2,499	853,375	2,813,851	34.0	Piezometer
H-10-01	2,585	859,623	2,830,666	55.0	None
H-10-04	2,522	853,676	2,814,117	25.0	Piezometer
H-11-04	2,546	854,276	2,814,717	56.0	Piezometer
H-11A-04	2,546	854,283	2,814,721	25.0	Piezometer
H-12-04	2,509	854,939	2,815,770	35.0	Piezometer
H-13-04	2,500	854,776	2,815,843	19.0	Piezometer
H-14-04	2,507	855,122	2,816,857	43.0	Piezometer
H-15-04	2,500	855,132	2,817,452	45.0	Piezometer
H-16-04	2,461	854,899	2,817,235	30.0	Piezometer
H-17-04	2,458	854,938	2,817,860	36.0	Piezometer
H-18-04	2,477	855,254	2,818,303	45.0	Piezometer
H-19-04	2,480	855,202	2,818,750	54.0	Piezometer
H-20-04	2,493	855,124	2,819,149	49.0	Piezometer
H-21-04	2,493	855,136	2,819,649	70.0	Piezometer
H-22-04	2,494	855,545	2,822,342	27.0	Piezometer
H-23-04	2,492	855,784	2,823,081	30.5	Piezometer
H-24-04	2,500	856,308	2,823,460	15.0	None
H-25-04	2,533	856,434	2,823,683	60.5	Piezometer
H-26-04	2,515	856,498	2,823,899	31.0	None
H-27-04	2,527	856,648	2,824,127	35.0	Piezometer
H-28-04	2,522	856,759	2,824,355	36.0	None
H-29-04	2,522	856,856	2,824,526	33.0	None
H-30-04	2,518	856,952	2,824,700	25.0	None
H-31-04	2,512	857,428	2,825,854	25.0	None
H-32-04	2,532	857,630	2,826,422	35.0	Piezometer
H-33-04	2,531	857,751	2,826,796	29.5	Piezometer
H-34-04	2,528	858,043	2,827,376	35.0	Piezometer
H-35-04	2,524	858,250	2,827,665	30.5	Piezometer
H-36-04	2,510	859,293	2,829,059	21.0	None
H-37-04	2,516	859,636	2,829,584	15.0	Piezometer
H-38-04	2,512	859,482	2,829,625	26.0	Piezometer
H-39-04	2,516	859,620	2,830,113	30.0	Piezometer
H-40-04	2,592	859,835	2,830,849	47.1	Piezometer
H-41-04	2,548	859,870	2,831,373	30.5	None
H-42-03	2,517	859,402	2,831,419	45.5	Piezometer
H-43-04	2,520	859,832	2,831,857	35.5	Piezometer
H-44-03	2,518	859,708	2,832,244	40.0	Piezometer
H-45-03	2,541	859,256	2,832,409	40.0	Piezometer
H-46-04	2,521	859,145	2,833,156	26.0	Piezometer
H-47-04	2,552	858,357	2,834,055	45.5	Piezometer

Table 2 Summary of Groundwater Data
Pullman to Idaho State Line
SR 270

Boring	Bottom Elevation (feet MSL)	Ground Elevation (feet MSL)	3/11/2004		3/31/2004		4/6/2004		4/20/2004		5/5/2004		5/20/2004		6/6/2004		6/17/2004		7/2/2004		7/28/2004		11/20/2004	
			Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)	Depth to Water (feet)	Water Elevation (feet MSL)
H-1	2,390.51	2,410.68	15.00	2,395.68	17.50	2,393.18	19.17	2,391.51	18.90	2,391.78	18.97	2,391.71	Dry	< 2390.51	Dry	< 2390.51	Dry	< 2390.51	Dry	< 2390.51	Dry	< 2390.51	Dry	< 2390.51
H-6	2,456.43	2,476.01	18.42	2,457.59	19.33	2,456.68	19.08	2,456.93	19.50	2,456.51	19.55	2,456.46	Dry	< 2456.42	Dry	< 2456.42	Dry	< 2456.42	Dry	< 2456.42	Dry	< 2456.42	Dry	< 2456.42
H-7	2,453.04	2,493.54	39.92	2,453.62	39.75	2,453.79	40.25	2,453.29	39.70	2,453.84	39.81	2,453.73	Dry	< 2453.04	Dry	< 2453.04	Dry	< 2453.04	Dry	< 2453.04	Dry	< 2453.04	Dry	< 2453.04
H-9	2,465.82	2,499.32	17.42	2,481.90	17.17	2,482.15	17.25	2,482.07	17.10	2,482.22	17.31	2,482.01	17.40	2,481.92	17.35	2,481.97	17.45	2,481.87	17.40	2,481.92	17.20	2,482.12	16.60	2,482.72
H-10	2,498.11	2,522.11	18.42	2,503.69	18.67	2,503.44	18.33	2,503.78	19.00	2,503.11	18.72	2,503.39	18.90	2,503.21	19.10	2,503.01	19.90	2,502.21	19.15	2,502.96	19.10	2,503.01	19.50	2,502.61
H-11	2,493.03	2,545.61	44.75	2,500.86	44.67	2,500.94	44.83	2,500.78	44.60	2,501.01	44.55	2,501.06	44.65	2,500.96	44.80	2,500.81	45.00	2,500.61	44.80	2,500.81	44.70	2,500.91	21.50	2,524.11
H-11A	2,521.00	2,545.75	21.17	2,524.58	21.17	2,524.58	21.42	2,524.33	Dry	< 2521.00	21.51	2,524.24	21.45	2,524.30	21.70	2,524.05	22.00	2,523.75	21.90	2,523.85	21.40	2,524.35	Dry	< 2521.00
H-12	2,488.60	2,509.35	12.50	2,496.85	11.67	2,497.68	9.92	2,499.43	12.80	2,496.55	12.72	2,496.63	12.75	2,496.60	12.10	2,497.25	12.70	2,496.65	12.75	2,496.60	12.85	2,496.50	12.60	2,496.75
H-13	2,490.09	2,499.67	6.58	2,493.09	7.25	2,492.42	6.50	2,493.17	7.50	2,492.17	7.31	2,492.36	7.50	2,492.17	6.95	2,492.72	7.20	2,492.47	7.10	2,492.57	7.30	2,492.37	8.60	2,491.07
H-14	2,467.64	2,506.81	26.92	2,479.89	27.42	2,479.39	25.92	2,480.89	25.20	2,481.61	28.30	2,478.51	28.60	2,478.21	27.50	2,479.31	29.00	2,477.81	28.80	2,478.01	27.20	2,479.61	29.50	2,477.31
H-15	2,455.61	2,499.94	24.83	2,475.11	25.33	2,474.61	24.58	2,475.36	23.80	2,476.14	23.10	2,476.84	25.30	2,474.64	25.15	2,474.79	25.60	2,474.34	39.40	2,460.54	43.60	2,456.34	25.80	2,474.14
H-16	2,432.64	2,461.14	10.00	2,451.14	11.25	2,449.89	9.92	2,451.22	12.10	2,449.04	12.65	2,448.49	12.80	2,448.34	12.65	2,448.49	13.55	2,447.59	14.00	2,447.14	14.80	2,446.34	-	-
H-17	2,445.99	2,456.24	1.83	2,456.24	2.50	2,455.57	2.00	2,456.07	4.00	2,454.07	4.65	2,453.42	4.60	2,453.47	4.50	2,453.57	5.30	2,452.77	6.65	2,451.42	8.50	2,449.57	5.60	2,452.47
H-18	2,431.61	2,476.78	25.08	2,451.70	26.25	2,450.53	26.58	2,450.20	26.40	2,450.38	27.25	2,449.53	27.15	2,449.63	27.00	2,449.78	27.45	2,449.33	5.70	2,471.08	28.10	2,448.68	27.50	2,449.28
H-19	2,427.14	2,480.47	28.17	2,452.30	28.83	2,451.64	29.33	2,451.14	29.00	2,451.47	29.70	2,450.77	29.55	2,450.92	29.75	2,450.72	30.00	2,450.47	30.30	2,450.17	30.50	2,449.97	30.20	2,450.27
H-20	2,445.96	2,493.38	35.33	2,458.05	35.67	2,457.71	35.50	2,457.88	36.00	2,457.38	36.45	2,456.93	36.50	2,456.88	36.50	2,456.88	37.00	2,456.38	38.00	2,455.38	39.25	2,454.13	-	-
H-21	2,443.89	2,493.14	24.00	2,469.14	25.33	2,467.81	25.83	2,467.31	27.00	2,466.14	27.95	2,465.19	28.80	2,464.34	29.30	2,463.84	29.80	2,463.34	30.40	2,462.74	32.00	2,461.14	-	-
H-22	2,467.90	2,494.48	5.33	2,489.15	5.50	2,488.98	5.92	2,488.56	Dry	< 2467.89	6.13	2,488.35	6.00	2,488.48	6.40	2,488.08	6.90	2,487.58	7.30	2,487.18	6.20	2,488.28	6.00	2,488.48
H-23	2,464.13	2,491.63	14.25	2,477.38	15.00	2,476.63	15.08	2,476.55	Dry	< 2464.13	15.75	2,475.88	15.75	2,475.88	15.45	2,476.18	15.80	2,475.83	16.40	2,475.23	15.75	2,475.88	15.40	2,476.23
H-25	2,472.56	2,532.56	38.42	2,494.14	40.50	2,492.06	41.33	2,491.23	42.20	2,490.36	43.35	2,489.21	42.70	2,489.86	42.70	2,489.86	43.80	2,488.76	46.80	2,485.76	49.30	2,483.26	-	-
H-27	2,503.19	2,526.52	19.25	2,507.27	19.33	2,507.19	20.33	2,506.19	20.50	2,506.02	20.70	2,505.82	20.70	2,505.82	20.90	2,505.62	20.90	2,505.62	20.90	2,505.62	21.00	2,505.52	-	-
H-32	2,512.20	2,531.78	6.92	2,524.86	7.50	2,524.28	7.50	2,524.28	7.40	2,524.38	7.45	2,524.33	7.60	2,524.18	7.50	2,524.28	7.85	2,523.93	8.00	2,523.78	8.40	2,523.38	-	-
H-33	2,511.46	2,530.88	9.42	2,521.46	10.17	2,520.71	11.42	2,519.46	11.70	2,519.18	11.80	2,519.08	12.00	2,518.88	11.20	2,519.68	11.80	2,519.08	12.50	2,518.38	15.40	2,515.48	-	-
H-34	2,511.88	2,527.80	9.33	2,518.47	14.83	2,512.97	15.08	2,512.72	14.70	2,513.10	15.55	2,512.25	15.50	2,512.30	Dry	< 2511.88	Dry	< 2511.88	Dry	< 2511.88	Dry	< 2511.88	-	-
H-35	2,496.26	2,524.26	23.17	2,501.09	23.25	2,501.01	23.17	2,501.09	23.00	2,501.26	23.30	2,500.96	23.40	2,500.86	23.50	2,500.76	23.85	2,500.41	24.20	2,500.06	24.50	2,499.76	-	-
H-37	2,506.27	2,515.60	3.33	2,512.27	2.67	2,512.93	4.25	2,511.35	4.20	2,511.40	4.73	2,510.87	4.50	2,511.10	4.35	2,511.25	4.80	2,510.80	5.60	2,510.00	3.10	2,512.50	5.20	2,510.40
H-38	2,493.10	2,511.93	2.08	2,509.85	1.17	2,510.76	2.83	2,509.10	3.10	2,508.83	3.45	2,508.48	3.20	2,508.73	3.00	2,508.93	3.40	2,508.53	3.90	2,508.03	5.40	2,506.53	3.30	2,508.63
H-39	2,499.10	2,516.10	1.00	2,515.10	2.00	2,514.10	2.17	2,513.93	2.20	2,513.90	2.50	2,513.60	2.45	2,513.65	2.30	2,513.80	2.60	2,513.50	3.11	2,512.99	3.50	2,512.60	2.70	2,513.40
H-40	2,553.52	2,592.02	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	Dry	< 2,553.52	-	-
H-42	2,502.75	2,516.92	4.58	2,512.34	4.17	2,512.75	6.08	2,510.84	4.80	2,512.12	5.40	2,511.52	5.35	2,511.57	5.00	2,511.92	5.50	2,511.42	6.20	2,510.72	6.95	2,509.97	6.30	2,510.62
H-43	2,502.14	2,519.64	3.83	2,515.81	4.50	2,515.14	3.17	2,516.47	5.00	2,514.64	5.74	2,513.90	5.50	2,514.14	5.30	2,514.34	5.90	2,513.74	6.60	2,513.04	7.50	2,512.14	6.50	2,513.14
H-44	2,478.61	2,518.11	1.33	2,516.78	1.83	2,516.28	2.17	2,515.94	2.10	2,516.01	3.00	2,515.11	2.50	2,515.61	2.35	2,515.76	3.10	2,515.01	3.90	2,514.21	4.55	2,513.56	3.20	2,514.91
H-45	2,500.78	2,540.78	18.17	2,522.61	18.92	2,521.86	19.25	2,521.53	19.30	2,521.48	19.40	2,521.38	19.50	2,521.28	19.30	2,521.48	19.80	2,520.98	20.10	2,520.68	20.30	2,520.48	26.80	2,513.98
H-46	2,499.60	2,520.93	1.50	2,519.43	2.08	2,518.85	2.50	2,518.43	2.45	2,518.48	2.85	2,518.08	2.75	2,518.18	2.60	2,518.33	2.90	2,518.03	3.45	2,517.48	3.80	2,517.13	-	-
H-47	2,506.32	2,551.99	28.00	2,523.99	28.50	2,523.49	28.50	2,523.49	28.90	2,523.09	29.10	2,522.89	29.30	2,522.69	29.45	2,522.54	29.80	2,522.19	30.40	2,521.59	30.25	2,521.74	-	-
BH-1	2,438.07	2,454.57	8.42	2,446.15	9.00	2,445.57	9.25	2,445.32	9.40	2,445.17	9.70	2,444.87	9.40	2,445.17	9.45	2,445.12	9.80	2,444.77	10.00	2,444.57	10.30	2,444.27	10.10	2,444.47
BH-3	2,434.31	2,463.48	11.00	2,452.48	12.17	2,451.31	12.58	2,450.90	13.10	2,450.38	13.74	2,449.74	13.75	2,449.73	13.60	2,449.88	14.00	2,449.48	14.40	2,449.08	15.20	2,448.28	14.50	2,448.98
BH-5	2,427.57	2,470.40	19.92	2,450.48	20.75	2,449.65	20.92	2,449.48	21.20	2,449.20	21.75	2,448.65	21.70	2,448.70	21.50	2,448.90	21.80	2,448.60	22.30	2,448.10	22.60	2,447.80	22.20	2,448.20
BH-7	2,468.59	2,481.26	5.50	2,475.76	7.08	2,474.18	6.00	2,475.26	7.50	2,473.76	7.90	2,473.36	7.80	2,473.46	7.50	2,473.76	7.80	2,473.46	8.40	2,472.86	8.50	2,472.76	8.20	2,473.06
BH-10	2,507.03	2,520.03	5.50	2,514.53	6.83	2,513.20	6.17	2,513.86	6.10	2,513.93	6.73	2,513.30	6.30	2,513.73	6.43	2,513.60	6.65	2,513.38	7.20	2,512.83	7.60	2,512.43	6.90	2,513.13
BH-12	2,483.13	2,519.13	4.83	2,514.30	5.33	2,513.80	7.83	2,511.30	5.40	2,513.73	6.15	2,512.98	5.80	2,513.33	5.95	2,513.18	6.20	2,512.93	6.55	2,512.58				

Table 3 Point Load Test Data Summary
Pullman Idaho State Line
SR 270

Boring Identification	Sample depth (ft. below ground)	Rock Type	Test	Sample Length (in)	Sample Diameter (in)	Gauge reading at failure (lbf)	Sample diameter squared (in) ²	Approximate UCS (PSI)	Approximate UCS (MPa)
H-02-04	10	Basalt	d	5.5	2.4	4000	5.76	17,254	119
	12	Basalt	d	5	2.4	5150	5.76	22,215	153
	14	Basalt	d	9	2.4	3900	5.76	16,823	116
H03-04	12	Basalt	d	5	2.4	5550	5.76	23,940	165
	13	Basalt	d	5	2.4	3300	5.76	14,235	98
	14	Basalt	d	10	2.4	4250	5.76	18,332	126
	15	Basalt	d	5	2.4	3650	5.76	15,744	108
	16	Basalt	d	9.5	2.4	7700	5.76	33,214	229
	20	Basalt	d	10.5	2.4	8300	5.76	35,802	247
	21	Basalt	d	10	2.4	2700	5.76	11,646	80
	23	Basalt	d	11	2.4	6550	5.76	28,253	195
H-04-04	11	Basalt	d	9	2.4	7200	5.76	31,057	214
	13	Basalt	d	5	2.4	9000	5.76	38,821	267
	16	Basalt	d	8.5	2.4	7900	5.76	34,077	235
	17	Basalt	d	9	2.4	2500	5.76	10,784	74
	19	Basalt	d	8	2.4	8400	5.76	36,233	250
	23	Basalt	d	7	2.4	3300	5.76	14,235	98
	27	Basalt	d	7	2.4	4550	5.76	19,626	135
	29	Basalt	d	10	2.4	5900	5.76	25,450	175
H-05-04	13	Basalt	d	9.5	2.4	7350	5.76	31,704	218
	17	Basalt	d	9	2.4	5000	5.76	21,567	149
	19	Basalt	d	10	2.4	8000	5.76	34,508	238
	21	Basalt	d	12	2.4	9150	5.76	39,468	272
H-21-04	14	Basalt	d	5	2.4	4000	5.76	17,254	119
	18	Basalt	d	5	2.4	2200	5.76	9,490	65
	29	Basalt	d	8.5	2.4	3900	5.76	16,823	116
H-22-04	14	Basalt	d	8.5	2.4	6400	5.76	27,606	190
	15	Basalt	d	9	2.4	6600	5.76	28,469	196
	23	Basalt	d	6.5	2.4	6250	5.76	26,959	186
H-25-04	15	Basalt	d	6	2.4	8000	5.76	34,508	238
	17	Basalt	d	6	2.4	5700	5.76	24,587	169
	19	Basalt	d	7	2.4	6000	5.76	25,881	178
H-26-04	7	Basalt	d	7.5	2.4	3100	5.76	13,372	92
	17	Basalt	d	9	2.4	8500	5.76	36,665	253
H-27-04	21	Basalt	d	8	2.4	8350	5.76	36,018	248
H-28-04	15	Basalt	d	7	2.4	6000	5.76	25,881	178
	20	Basalt	d	5	2.4	8600	5.76	37,096	256
H-30-04	17	Basalt	d	6	2.4	7800	5.76	33,645	232
	19	Basalt	d	5	2.4	6900	5.76	29,763	205
H-32-04	13	Basalt	d	8	2.4	6000	5.76	25,881	178
	15	Basalt	d	5	2.4	5250	5.76	22,646	156
	21	Basalt	d	7	2.4	6800	5.76	29,332	202
H-33-04	13	Basalt	d	5	2.4	5200	5.76	22,430	155
	18	Basalt	d	7	2.4	5800	5.76	25,018	172
	27	Basalt	d	6.5	2.4	8400	5.76	36,233	250
H-34-04	20	Basalt	d	10	2.4	2600	5.76	11,215	77
	24	Basalt	d	12	2.4	6200	5.76	26,744	184
	26	Basalt	d	6.5	2.4	6500	5.76	28,038	193

Notes:

$$I_s = \text{lbf/in}^2$$

$$I_{s50} = (D/50)^{4.5} \times I_s \text{ (standard } D = 50,54\text{mm)}$$

$$\text{UCS}_{(\text{psi})} = (I_{s50}) \times (24)$$

$$\text{UCS}_{(\text{MPa})} = (\text{UCS}_{(\text{psi})}) \times (0.00689)$$

Table 4

**Summary of Aggregate Quality Test Data
Pullman to Idaho State Line
SR-270**

Sample Location	Approximate Station	Sample Depth (Feet)	Bulk Specific Gravity ⁽¹⁾	LA Abrasion ⁽²⁾	Degradation Factor ⁽³⁾
H-2-04	111+50	10-20	2.865	34	66
H-3-04	114+75	10-30	2.879	27	78
H-4-04	122+50	10-30	2.92	19	88
H-5-04	126+00	10-30	2.893	30	85
H-21-04	208+50	10-30	2.761	21	54
H-25-04	251+30	5-25	2.783	19	90
H-26-04	253+60	5-20	2.798	20	90
H-27-04	254+40	5-20	2.739	24	21
H-28-04	258+80	5-20	2.817	19	85
H-30-04	262+85	5-25	2.769	20	67
<i>WSDOT Standards (per 2004 Standard Specifications 9-03)*</i>					
Coarse Aggregate for PCC			NA	<35	NA
Bituminous Surface Treatment			NA	<35	>30
Aggregate for Asphalt Treated Base			NA	<30	>15
Aggregate for Asphalt Hot Mix (top course)			NA	<30	>30
Aggregate for Asphalt Hot Mix (other courses)			NA	<30	>20
Aggregate for Ballast			NA	<40	>15
Aggregate for Crushed Surfacing (top course)			NA	<35	>25
Aggregate for Crushed Surfacing (other courses)			NA	<35	>15

Notes:

- (1) Per AASHTO T-85
- (2) Per AASHTO T-96
- (3) Per WSDOT TM 113
- * Note that values are for reference only. Additional material standards may apply.

Table 5 Proposed Grading and Recommended Slope Inclinations
Pullman to Moscow
SR 270

Station		Embankment			Cut Slope Inclination		Fill Slope Inclination	Comments	
Begin	End	Cut	Embankment	Cut Height	Embankment Height	Rock			Soil
Mainline									
80+00	89+50	X		25	NA	NA	2.5H:1V	NA	
89+50	97+00	X		20	NA	0.5H:1V	NA	NA	
97+00	109+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	
109+00	124+00	X		40	NA	0.5H:1V	2.5H:1V	NA	
124+00	127+00		X	NA	20	NA	NA	3H:1V	
127+00	137+50	X		50	NA	0.5H:1V	2.5H:1V	NA	< 5 to 10 feet of Loess Cover Anticipated
137+50	144+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	
144+00	148+00	X		20	NA	NA	2.5H:1V	NA	
148+00	156+50	X		50	NA	0.5H:1V	2.5H:1V	NA	< 5 feet of Loess Cover Anticipated
156+50	185+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	
185+00	189+50	X		30	NA	0.5H:1V	2.5H:1V	NA	< 5 to 10 feet of Loess Cover Anticipated
189+50	198+50	X	X	<10	<10	NA	2.5H:1V	3H:1V	
198+00	203+00	X		30	NA	NA	2.5H:1V	NA	Compound cuts in soil and rock
203+00	213+00	X		75	NA	0.5H:1V	2.5H:1V	NA	
213+00	246+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	< 5 feet of Loess Cover Anticipated
246+00	265+00	X		30	NA	0.5H:1V	NA	NA	
265+00	273+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	< 5 feet of Loess Cover Anticipated
273+00	276+00	X		25	NA	NA	2.5H:1V	NA	
276+00	305+00	X		40	NA	0.5H:1V	2.5H:1V	NA	
305+00	314+00	X	X	<10	<10	NA	2.5H:1V	3H:1V	Cuts in soil and rock
314+00	324+00		X	NA	25	NA	NA	3H:1V	
324+00	334+00	X		45	NA	0.5H:1V	2.5H:1V	NA	
334+00	343+00		X	NA	15	NA	NA	3H:1V	Unsuitable foundation soils may be encountered; see text for recommendations
343+00	360+00		X	NA	<10	NA	NA	3H:1V	
360+00	371+50	X		30	NA	0.5H:1V	2.5H:1V	NA	
371+50	394+85	X	X	<10	<10	NA	2.5H:1V	3H:1V	

Figures

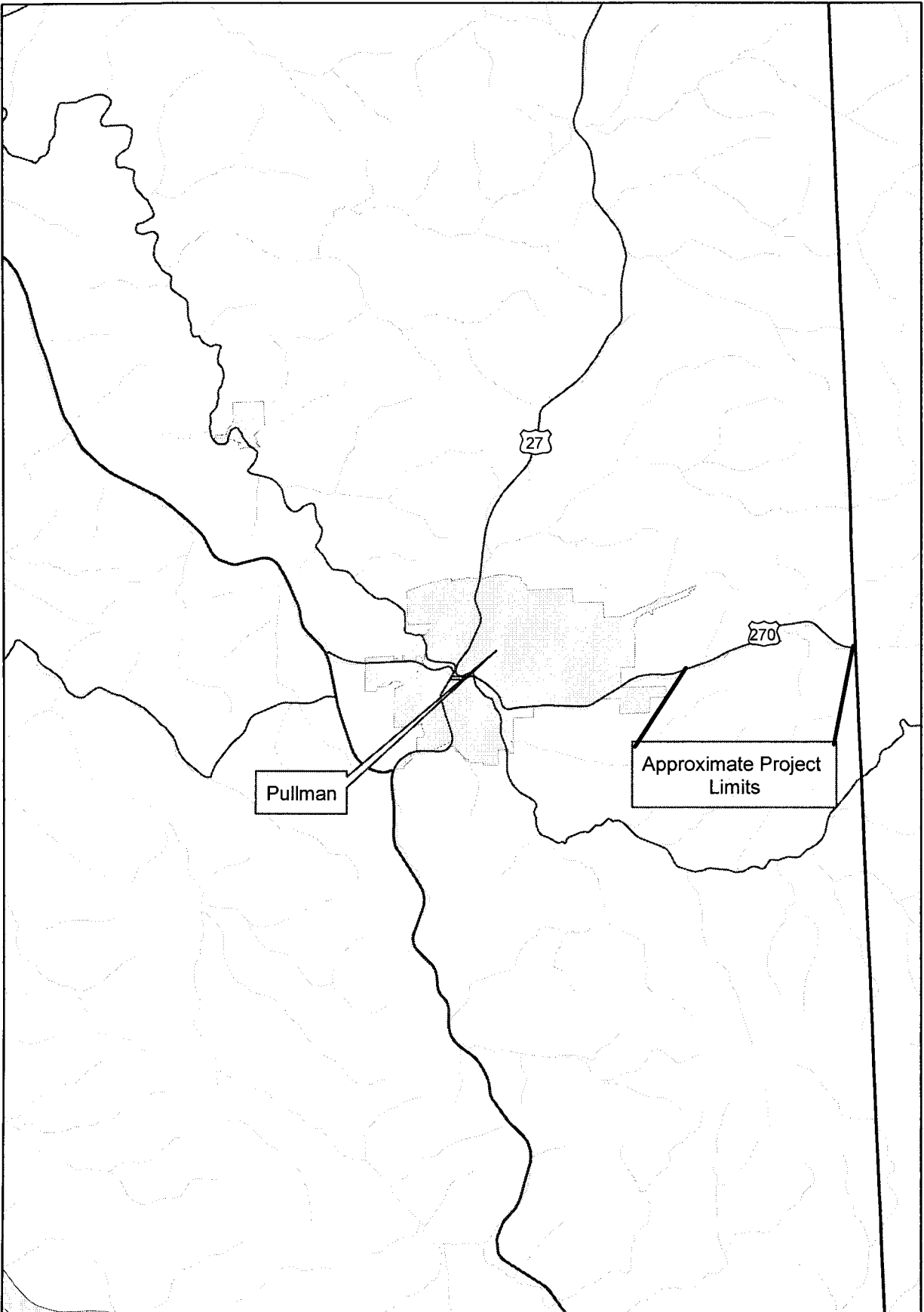
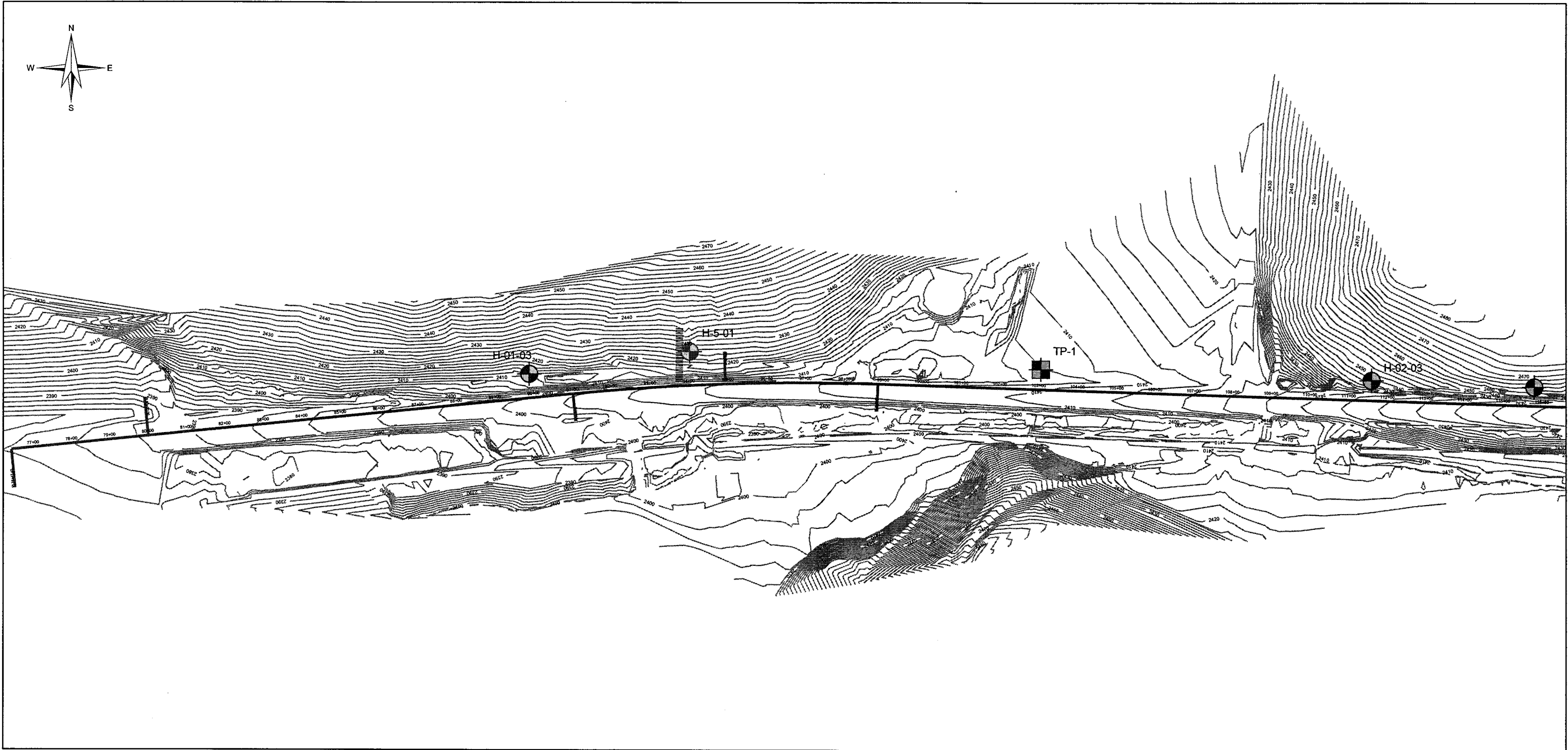


Figure 1 - Site Location Map



Legend






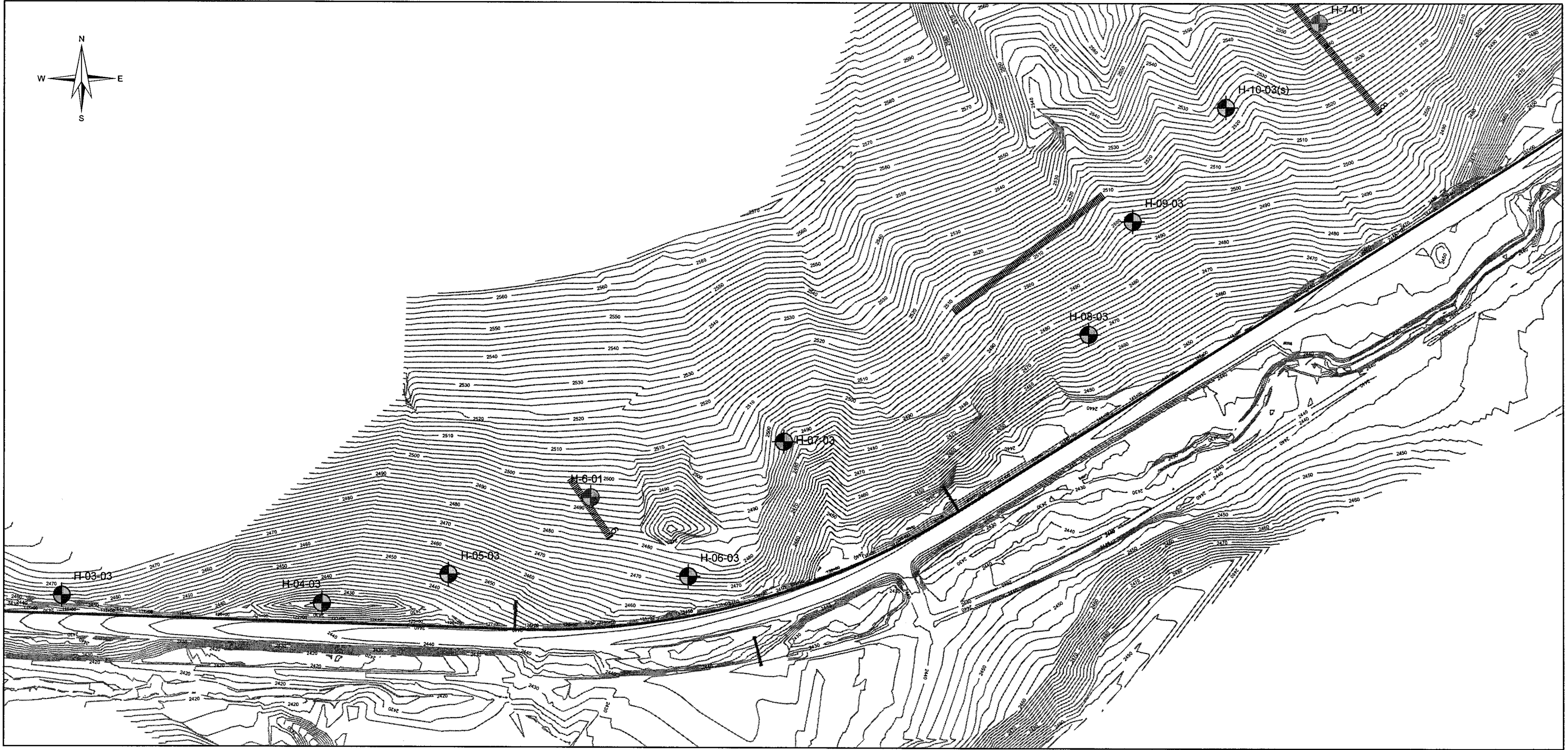
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2A - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION Geotechnical Services Division	Date <u>April 2005</u>
	Scale <u>1"=250'</u>
	Sheet <u>1</u> of <u>9</u>



Legend








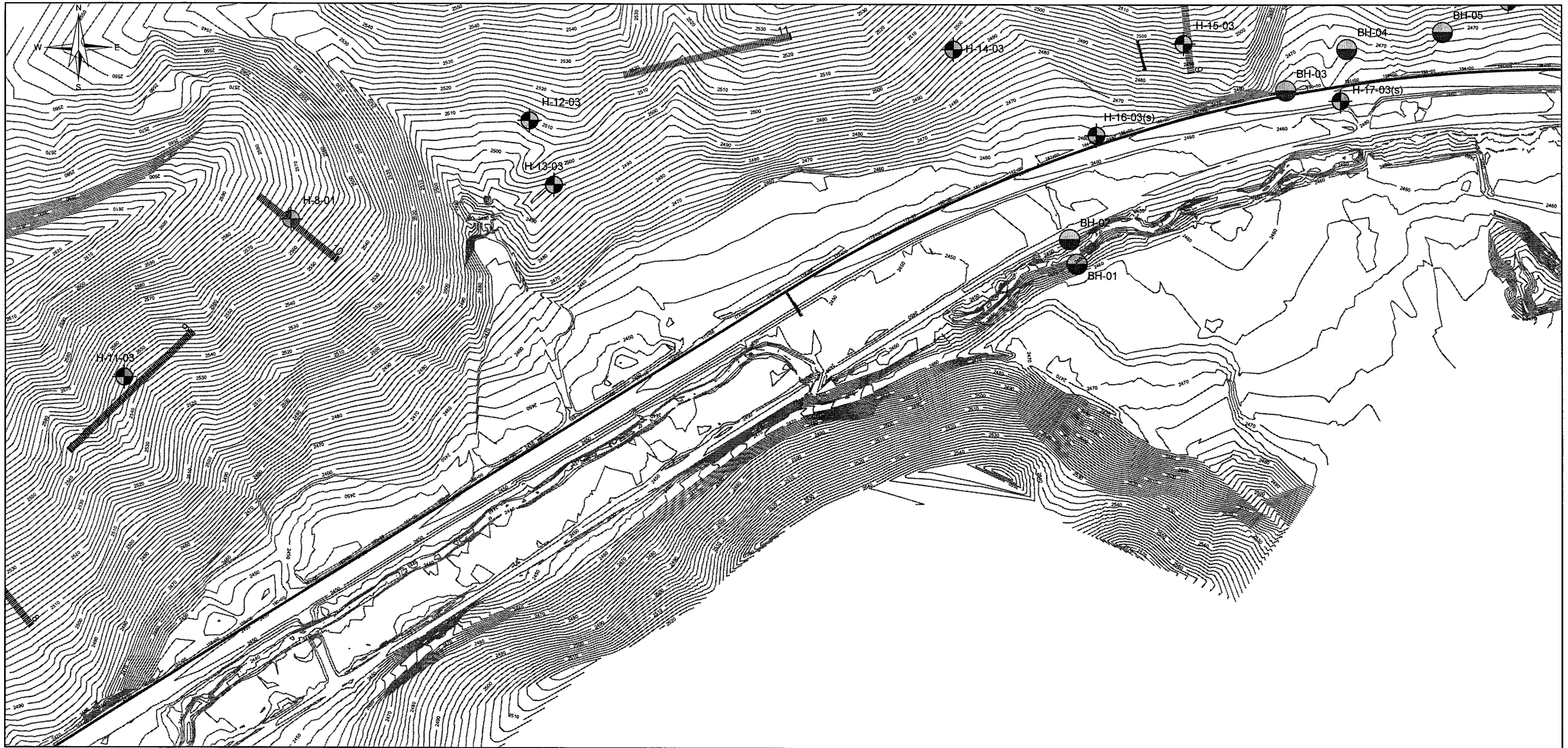
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2B - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
 Geotechnical Services Division 	Scale <u>1"=250'</u>
	Sheet <u>2</u> of <u>9</u>



Legend






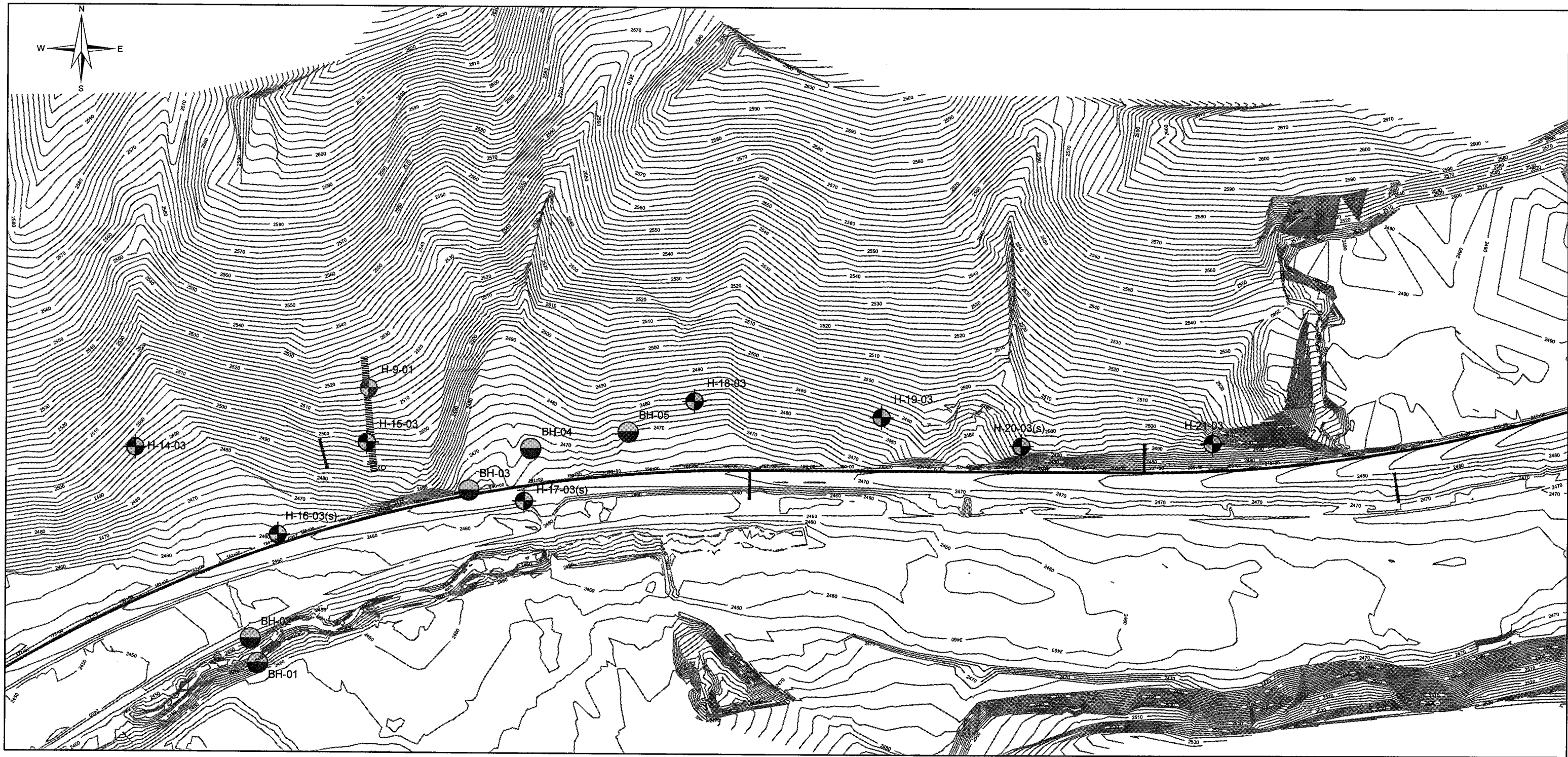
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2C - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
Geotechnical Services Division	Scale 1"=250'
	Sheet 3 of 9

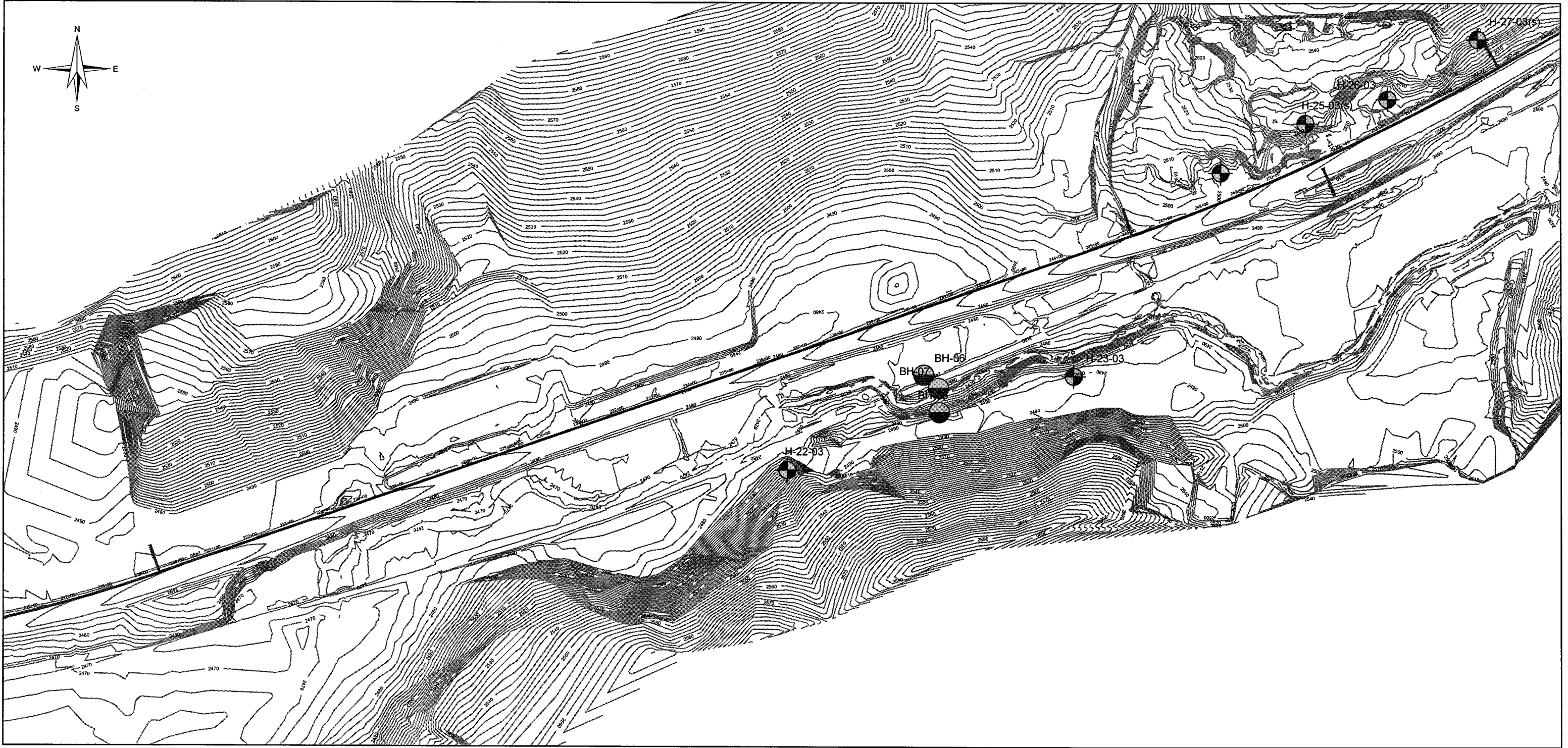


Legend

- Test Trench
- Geotechnical Borings (Right of Way)
- Geotechnical Borings (Foundation/Structure)
- Geotechnical Borings (Grading)
- Seismic Survey Line

Figure 2D - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
	Scale 1"=250'
	Sheet 4 of 9
Geotechnical Services Division	



Legend








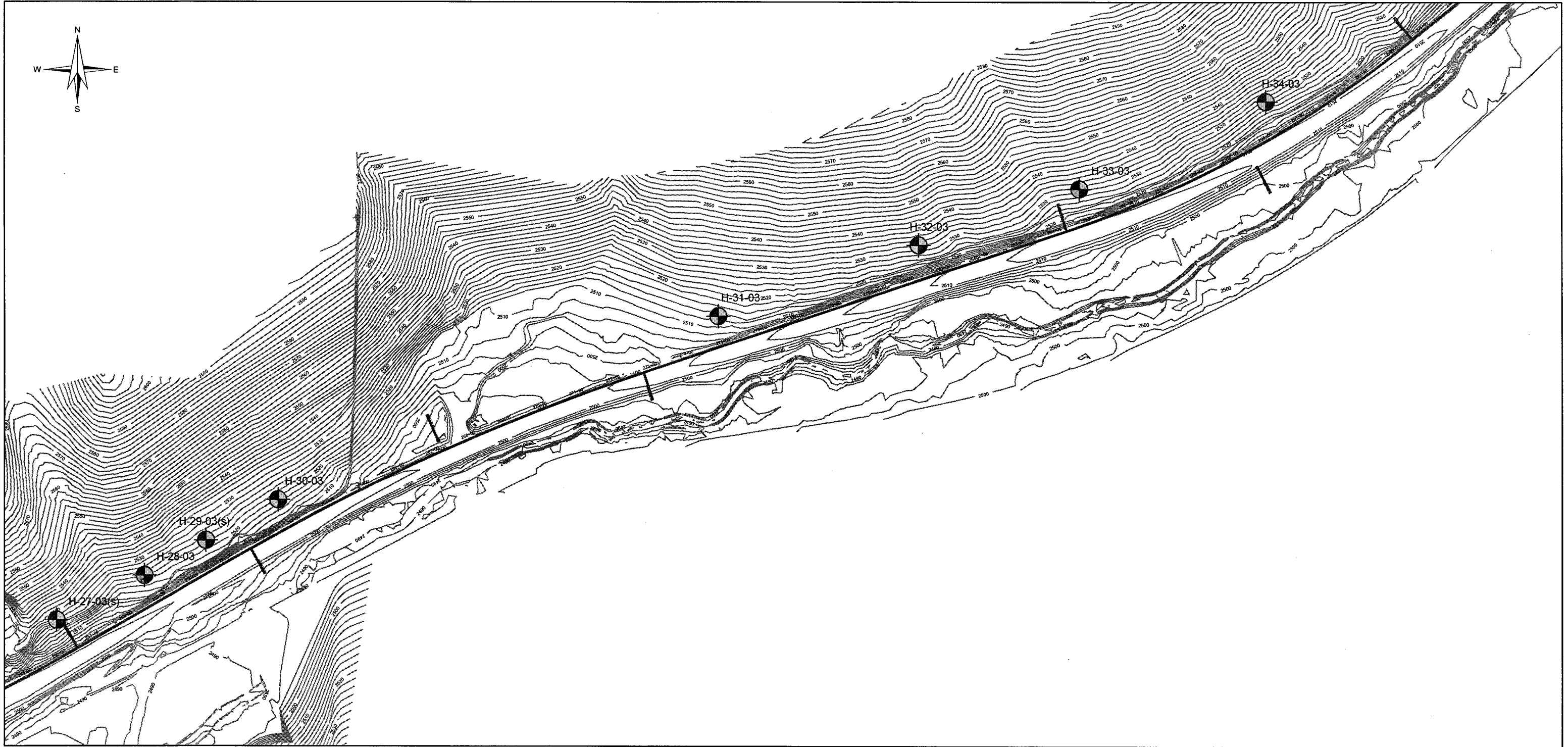
- 
Test Trench
- 
Geotechnical Borings (Right of Way)
- 
Geotechnical Borings (Foundation/Structure)
- 
Geotechnical Borings (Grading)
- 
Seismic Survey Line

Figure 2E - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
 Geotechnical Services Division 	Scale 1"=250'
Sheet 5 of 9	



Legend








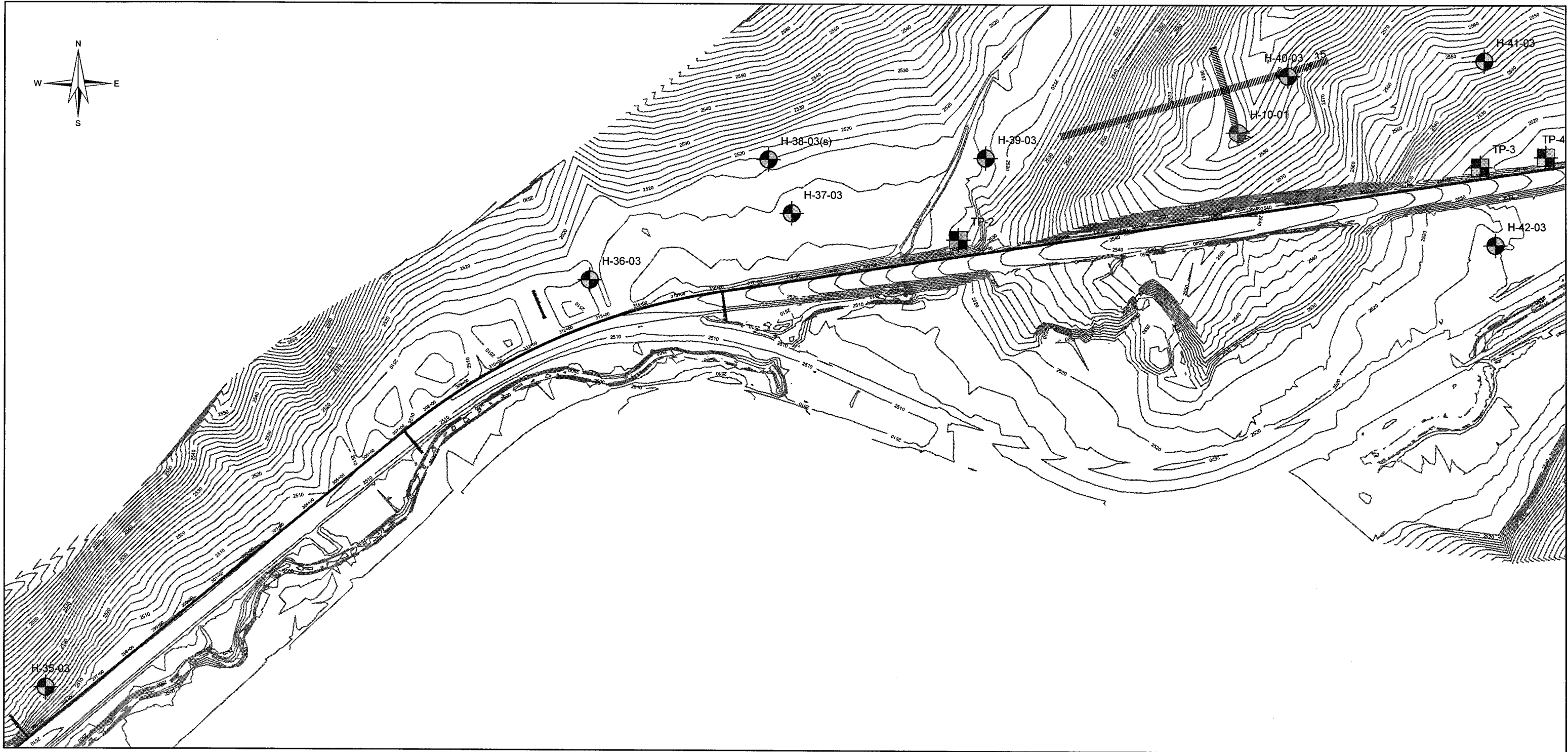
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2F - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
<div>WASHINGTON STATE DEPARTMENT OF TRANSPORTATION</div> <div>  Geotechnical Services Division  </div>	Date <u>April 2005</u>
	Scale 1"=250'
	Sheet 6 of 9



Legend








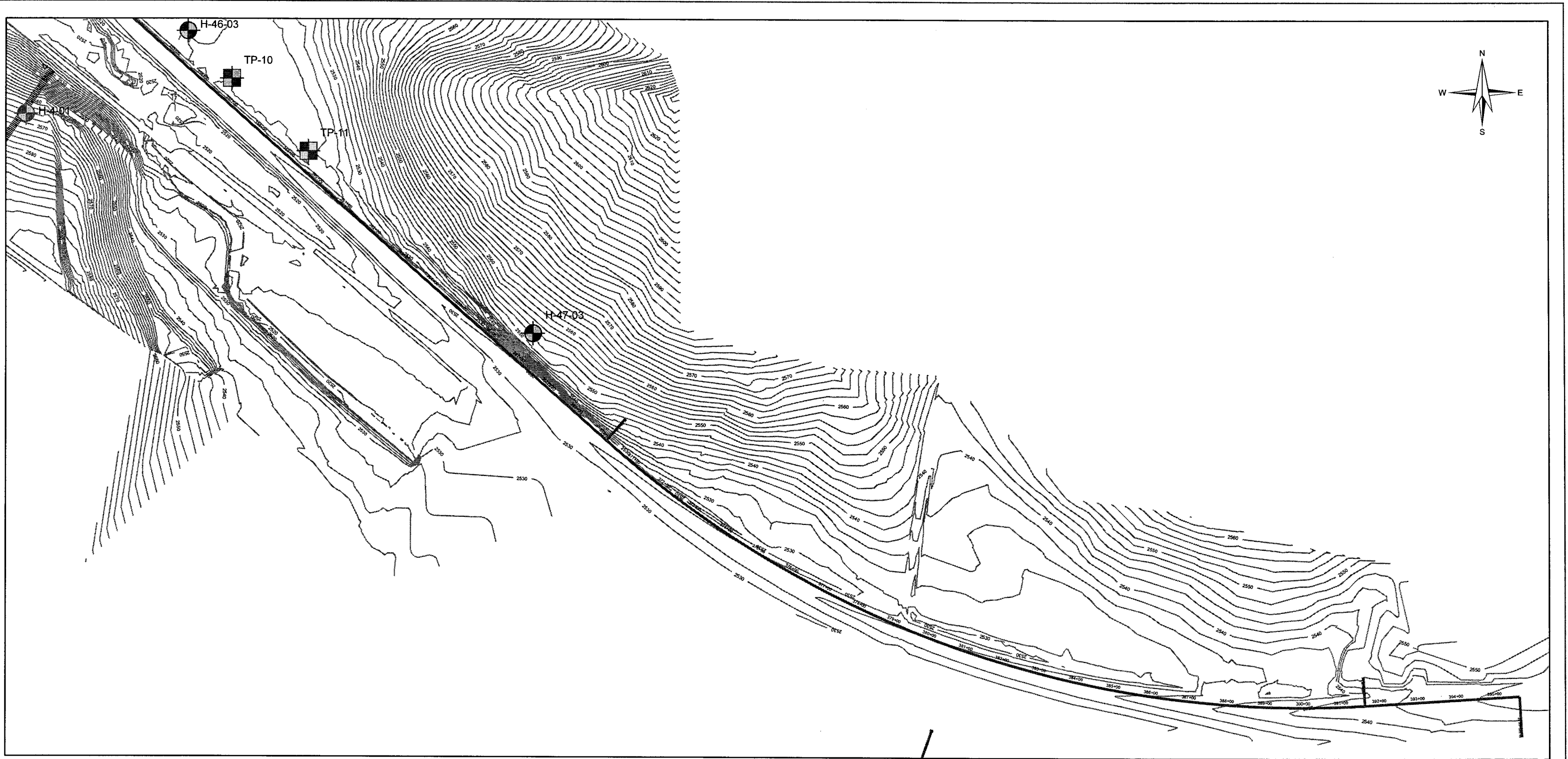
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2G - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
	Scale <u>1"=250'</u>
	Sheet <u>7</u> of <u>9</u>
<div> <div>  Geotechnical Services Division </div> <div>  </div> </div>	



Legend






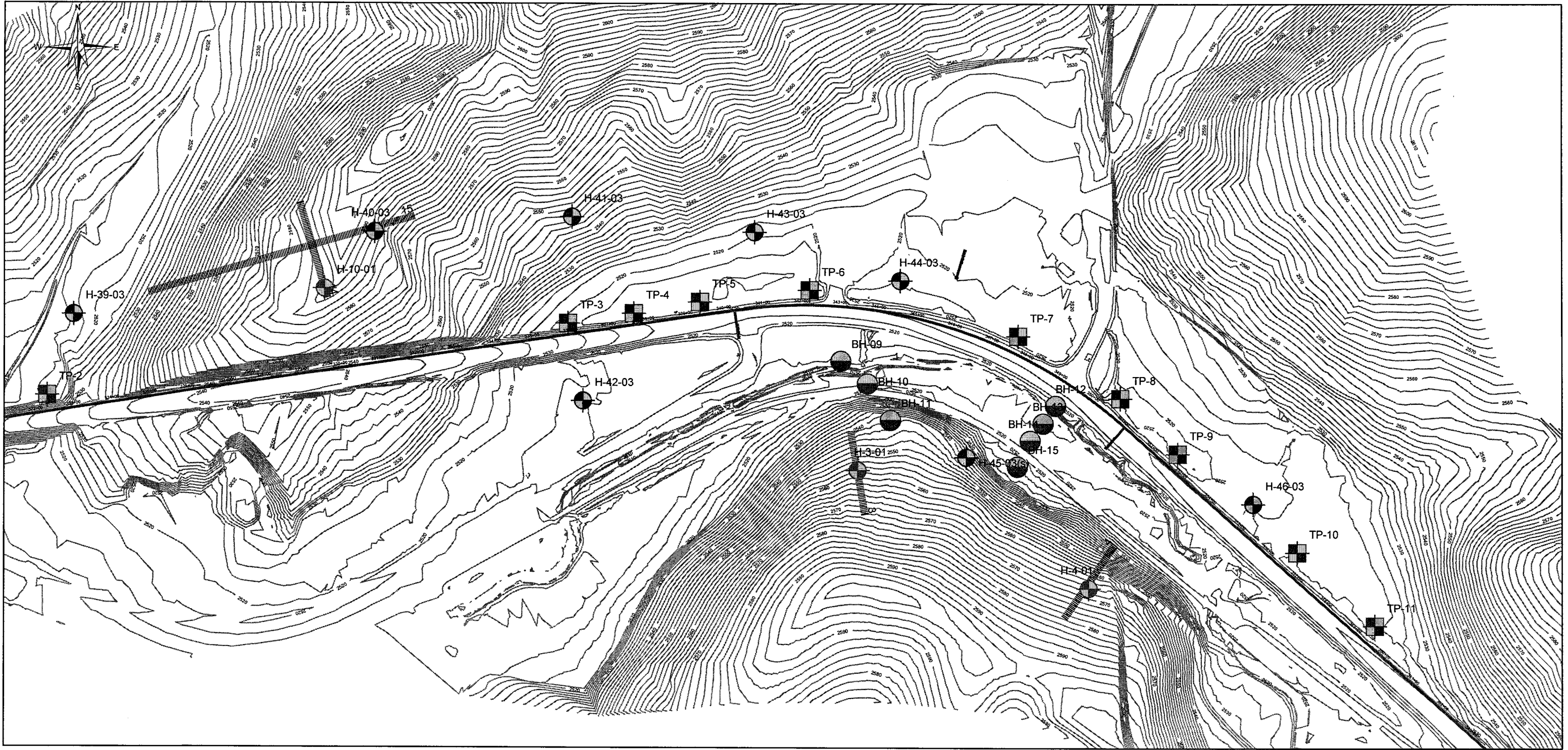
-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2I - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	Date <u>April 2005</u>
Geotechnical Services Division	Scale <u>1"=250'</u>
	Sheet <u>9</u> of <u>9</u>



Legend






-  Test Trench
-  Geotechnical Borings (Right of Way)
-  Geotechnical Borings (Foundation/Structure)
-  Geotechnical Borings (Grading)
-  Seismic Survey Line

Figure 2H - Site Plan

Job <u>XL-3502</u> S.R. <u>270</u> C.S. _____	
Pullman to Idaho State Line	
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION Geotechnical Services Division	Date <u>April 2005</u>
	Scale <u>1"=250'</u>
	Sheet <u>8</u> of <u>9</u>



Figure 3 – General site conditions

Spring and Seepage Control Method for Cut Areas

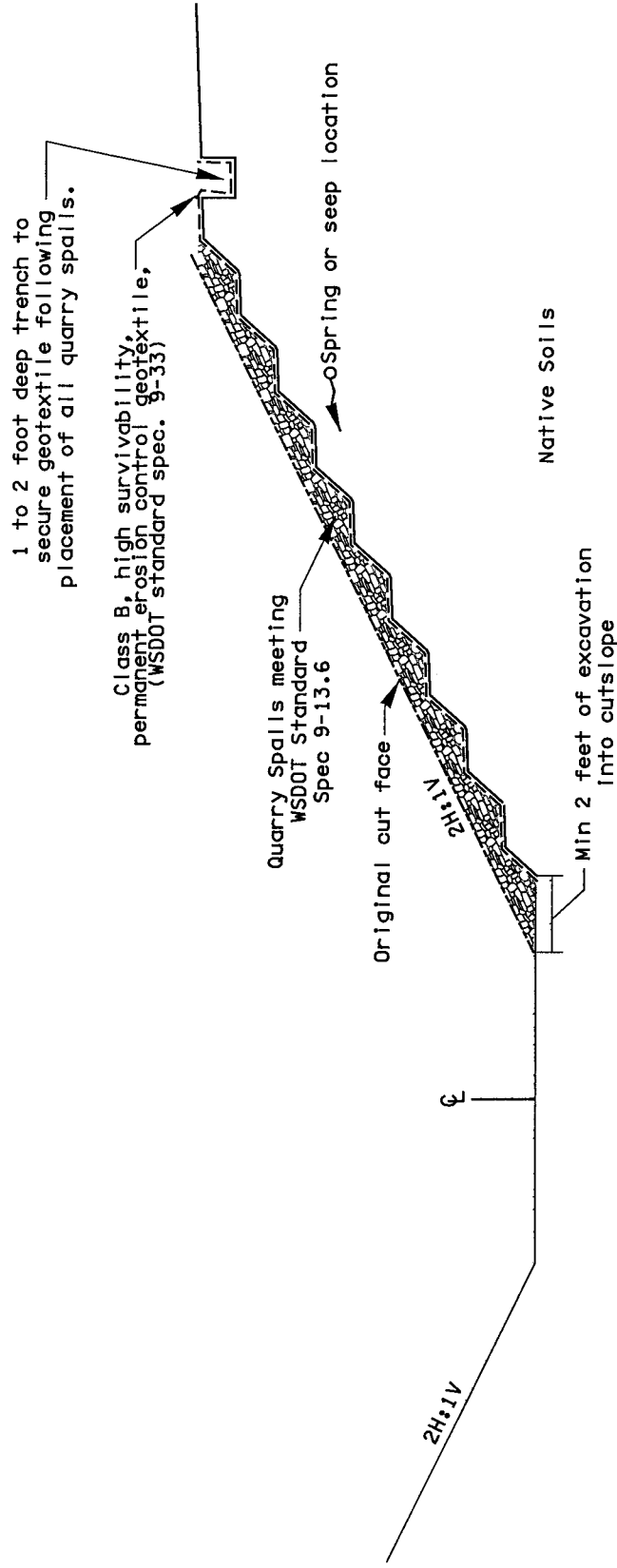


FIGURE 4

JOB OL-3502 S.R. 270 C.S. _____ LAYOUT _____	
Pullman to Moscow Safety Improvements	
WASHINGTON STATE TRANSPORTATION COMMISSION DEPARTMENT OF TRANSPORTATION	DATE 4/2004 SCALE _____ VERT. _____ HORIZ. _____
MATERIALS BRANCH T. E. BAKER MATERIALS ENGINEER	SHEET _____ OF _____ DRAWN BY W.M.

Appendix A

Boring and Test Trench Logs



LOG OF TEST BORING

Start Card R-65772

Job No. OL-3502

SR 270

Elevation 2454.6 (748.2 m)

HOLE No. BH-1-04

Sheet 1 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 16, 2004 Completion January 17, 2004 Well ID# AHP-438

Equipment CME 45 w/ auto hammer

Station FR2 6+23.9

Offset 4.85ft Lt.

Casing 4.5 x 17.0 & 3.5 x 46.0

Method Wet Rotary

Northing 854565.51

Easting 2817187.31

Latitude _____

Longitude _____

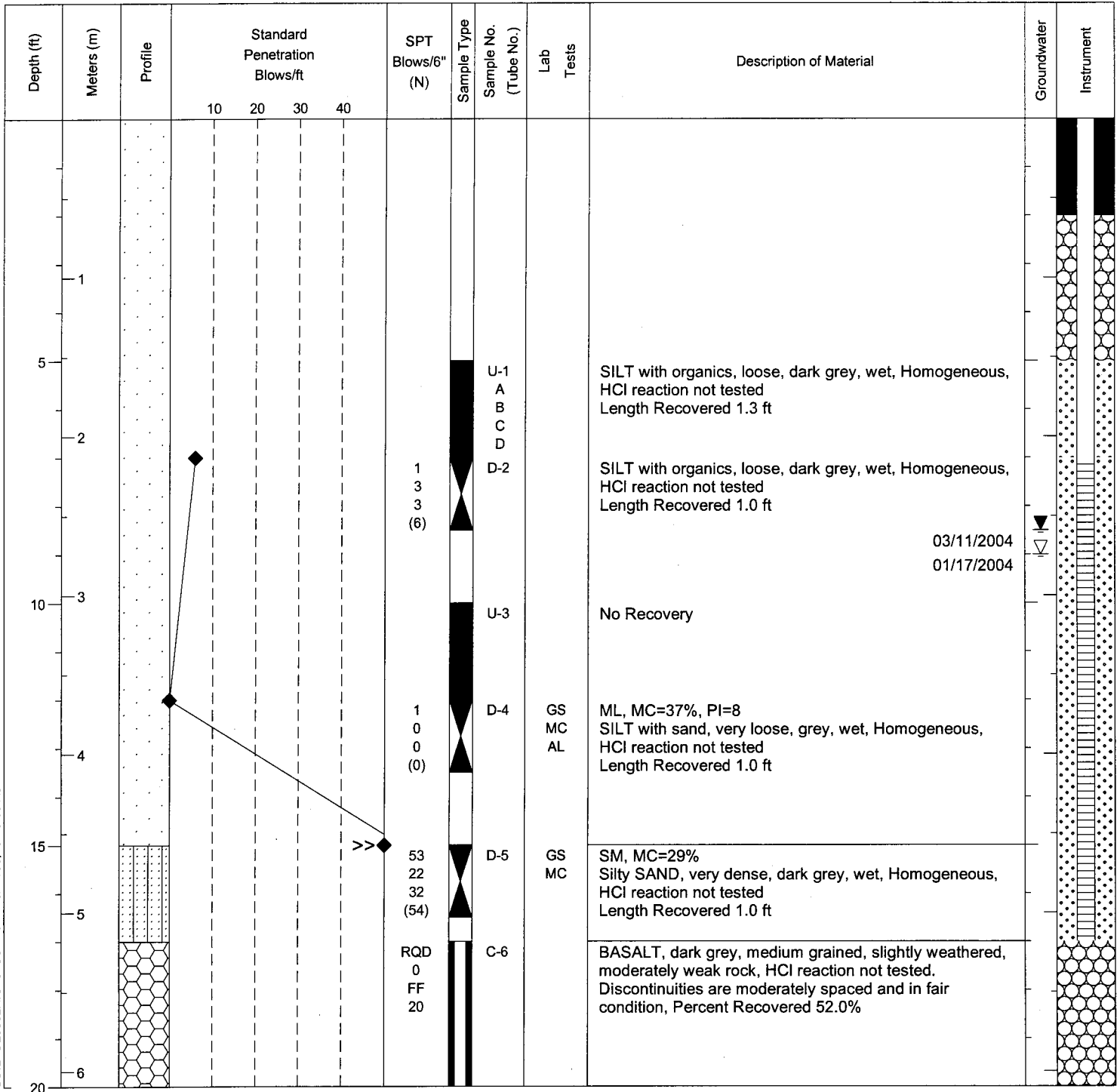
County Whitman

Subsection SW 1/4 of NW 1/4

Section 2

Range 45 EWM

Township 14 N





LOG OF TEST BORING

Start Card R-65772

Job No. OL-3502

SR 270

Elevation 2454.6 (748.2 m)

HOLE No. BH-1-04

Sheet 2 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 20		C-7		BASALT, dark grey, medium grained, slightly weathered, moderately weak rock, HCl reaction not tested. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25													
8							RQD 54 FF 3		C-8		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
9													
30													
10							RQD 74 FF 1		C-9		BASALT, dark grey, medium grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
35													
11													
40													
12							RQD 96 FF 0		C-10		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
13													
45													
							RQD 98 FF 0		C-11		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		



LOG OF TEST BORING

Start Card R-65772

Job No. OL-3502

SR 270

Elevation 2454.6 (748.2 m)

HOLE No. BH-1-04

Sheet 3 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14													
											End of test hole boring at 46 ft below ground elevation.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
50											NOTE: Bailed to 13.0', Unable to bail lower, Water coming in too fast Recharged to 9.0' Pipe in hole 3.5" x 46.0'		
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



LOG OF TEST BORING

Start Card S-23955

Job No. OL-3502 SR 270

Elevation 2451.0 (747.1 m)

HOLE No. BH-2-04

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 15, 2004 Completion January 16, 2004 Well ID# _____ Equipment CME 45 w/ auto hammer

Station FR2 6+91.7 Offset 4.69ft Rt. Casing 4.5 x 12.0 & 3.5 x 41.0 Method Wet Rotary

Northing 854631.68 Easting 2817169.91 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 2 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							3		D-1	GS	ML, MC=31%, PI=10 SILT with organics, loose, dark grey, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft 01/16/2004		
							4			MC			
							3			PI			
2							(7)						
									U-2		SILT, with organics, loose, dark grey, wet, Homogeneous, HCl reaction not tested Length Recovered 1.3 ft		
									A				
									B				
									C				
									D				
10							25		D-3	GS	SM, MC=12% Silty SAND with gravel, dense, grey, moist, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
							19			MC			
							22						
							(41)						
							RQD		C-4		BASALT, dark grey, medium grained, slightly weathered, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 90.0%		
							30						
							FF						
							2						
4													
15													
5							RQD		C-5		BASALT, dark grey, medium grained, slightly weathered, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
							56						
							FF						
							3						
6													
20													



LOG OF TEST BORING

Start Card S-23955

Job No. OL-3502 SR 270

Elevation 2451.0 (747.1 m)

HOLE No. BH-2-04

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 96 FF 0		C-6		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
25													
8							RQD 80 FF 0		C-7		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
30													
9													
30							RQD 70 FF 1		C-8		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
10													
35													
11							RQD 80 FF 1		C-9		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, @ bottom of core infilling of quartz, Percent Recovered 100.0%		
12													
40													
13											End of test hole boring at 41 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45													



LOG OF TEST BORING

Start Card R 65772

Job No. OL-3502 SR 270

Elevation 2463.5 (750.9 m)

HOLE No. BH-3-04

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller Joe Judd Lic# 2454

Site Address _____

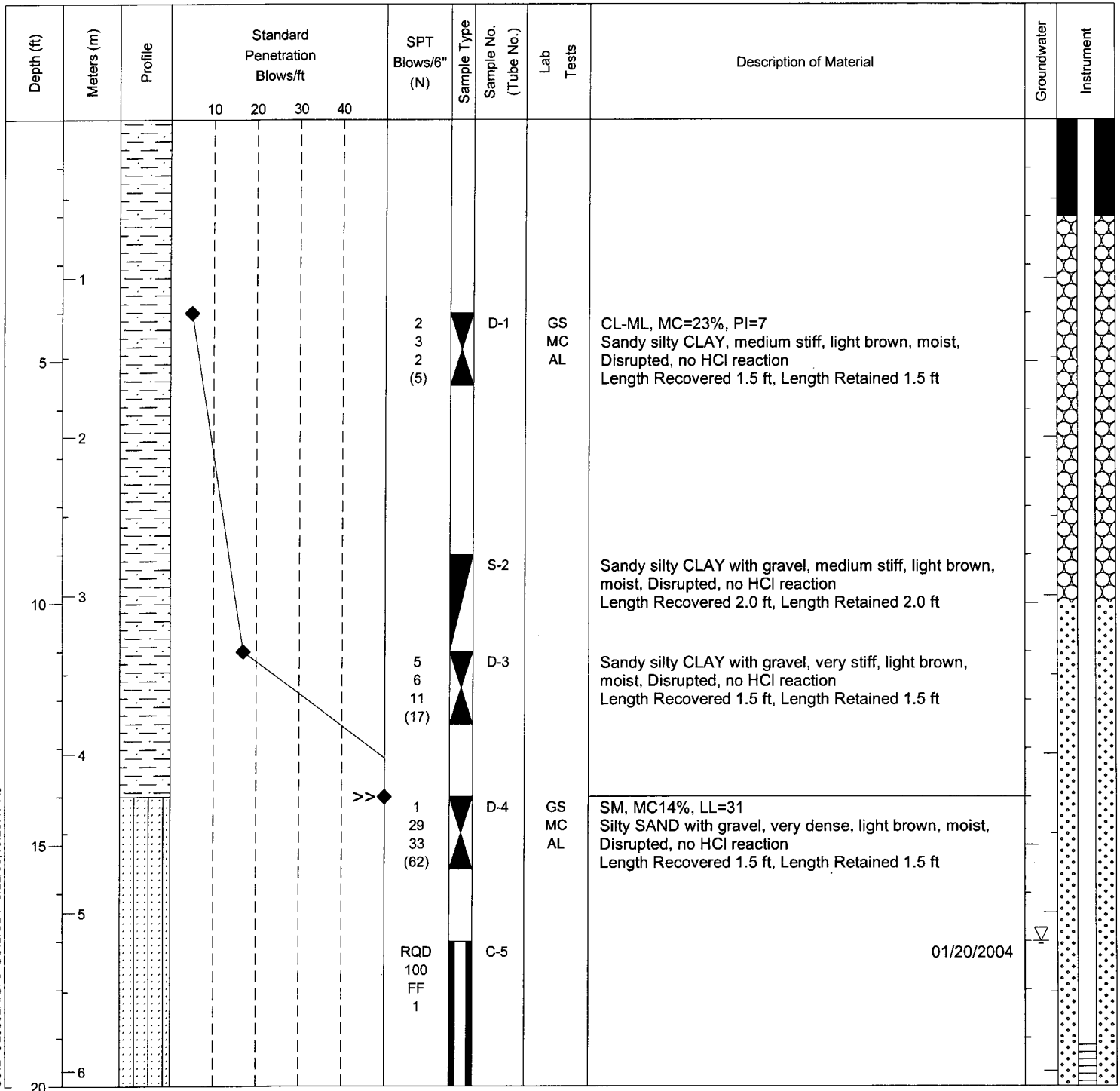
Inspector Dan Reed

Start January 20, 2004 Completion January 20, 2004 Well ID# AHP 439 Equipment CME 850 w/ autohammer

Station EW 190+22.08 Offset 10.35ft Rt. Casing 4"x30 Method Wet Rotary

Northing 855020.54 Easting 2817720.52 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 2 Range 45 e. Township 14





LOG OF TEST BORING

Start Card R 65772

Job No. OL-3502

SR 270

Elevation 2463.5 (750.9 m)

HOLE No. BH-3-04

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 70 FF 4		C-6		BASALT, gray, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
25							RQD 76 FF 2.2		C-7		BASALT, gray, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
30													
10											End of test hole boring at 30 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail hole to 25', recharge to 17' in one hour.		
35													
11													
40													
12													
45													
13													



LOG OF TEST BORING

Start Card S-23956

Job No. OL-3502

SR 270

Elevation 2465.7 (751.5 m)

HOLE No. BH-4-04

Sheet 1 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 27, 2004 Completion January 27, 2004 Well ID# _____ Equipment CME 850 w/ autohammer

Station EW191+99.27 Offset 26.22ft Lt. Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 855115.72 Easting 2817874.38 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the NW 1/4 Section 2 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							2 3 2 (5)	D-1			Lean CLAY, medium stiff, light brown, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
2													
10								S-2			Lean CLAY, stiff, light brown, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
3							3 4 3 (7)	D-3		GS MC AL	CL, MC=26%, PI=14 Lean CLAY, medium stiff, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
4													
15							3 3 3 (6)	D-4			Lean CLAY, medium stiff, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
5													
20							1 17	D-5		GS MC	SM, MC=18% Silty SAND, very dense, Dark Brown, moist, Stratified, no		



LOG OF TEST BORING

Start Card S-23956

Job No. OL-3502

SR 270

Elevation 2465.7 (751.5 m)

HOLE No. BH-4-04

Sheet 2 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							52 (69)	▲			HCl reaction, Fine medium and coarse sand lenses. Length Recovered 1.5 ft, Length Retained 1.5 ft		
7							RQD 24 FF 5+		C-6		BASALT, Slightly Vesicular, medium grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25							RQD 38 FF 5+		C-7		01/27/2004 01/27/2004 BASALT, Slightly Vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Weathered zones within rock mass., Percent Recovered 98.0%		
8							RQD 84 FF 1.4		C-8		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
30							RQD 70 FF 2		C-9		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
10							RQD 75 FF 1.2		C-10		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
35													
40													
11													
12													
13													
45													



LOG OF TEST BORING

Start Card S-23956

Job No. OL-3502

SR 270

Elevation 2465.7 (751.5 m)

HOLE No. BH-4-04

Sheet 3 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 28.0 feet. Water table stabilized at 24.0 feet in 30 minutes.		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65773

Job No. OL-3502 SR 270

Elevation 2470.4 (753.0 m)

HOLE No. BH-5-04

Sheet 1 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 28, 2004 Completion January 28, 2004 Well ID# AHP440

Equipment CME 850 w/ autohammer

Station EW193+78.19

Offset 12.69ft Rt.

Casing HW-4.5/HQ-3.5

Method Wet Rotary

Northing 855140.6

Easting 2818055.78

Latitude _____

Longitude _____

County Whitman

Subsection SE 1/4 of the NW 1/4

Section 2

Range 45 EWM

Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							3 5 7 (12)	D-2			Lean CLAY, stiff, light. brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
10							5 7 9 (16)	D-3		GS MC AL	CL, MC=26%, PI=19 Lean CLAY with sand, very stiff, light. brown, moist, Disrupted, no HCl reaction, Trace of sand and organics Length Recovered 1.5 ft, Length Retained 1.5 ft		
4							RQD 38 FF 5+	C-4			BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Contact with rock at 13.0, Percent Recovered 100.0%		
15							RQD 36 FF 5+	C-5			BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Highly weathered zone within rock mass., Percent Recovered 90.0%		
5													
6													
20													



LOG OF TEST BORING

Start Card R-65773

Job No. OL-3502

SR 270

Elevation 2470.4 (753.0 m)

HOLE No. BH-5-04

Sheet 2 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 58 FF 3.4		C-6		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Weathered zone within rock mass., Percent Recovered 100.0% 01/28/2004 01/28/2004		
25							RQD 66 FF 2.2		C-7		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Weathered zone within rock mass., Percent Recovered 94.0%		
30							RQD 76 FF 2.4		C-8		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 96.0%		
35							RQD 74 FF 2		C-9		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 96.0%		
40							RQD 74 FF 3		C-10		BASALT, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
45													



LOG OF TEST BORING

Start Card R-65773

Job No. OL-3502

SR 270

Elevation 2470.4 (753.0 m)

HOLE No. BH-5-04

Sheet 3 of 3

Project Pullman to Moscow (Structures)

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 28.0 feet. Water table stabilized at 21.0 feet in one hour.		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



LOG OF TEST BORING

Start Card S-23957

Job No. OL-3502 SR 270

Elevation 2478.1 (755.3 m)

HOLE No. BH-6-04

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 20, 2004 Completion January 20, 2004 Well ID# _____ Equipment CME 45 w/ autohammer

Station SSFR 11+32.95 Offset 6.92ft Rt. Casing 4.5 x 12.0 & 3.5 x 30.0 Method Wet Rotary

Northing 855795.63 Easting 2822689.1 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 1 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2													
3													
10													
4													
15													
5													
6													
20													

SOIL OL3502A.GPJ SOIL.GDT 3/22/05,10:20:52 A3



LOG OF TEST BORING

Start Card S-23957

Job No. OL-3502

SR 270

Elevation 2478.1 (755.3 m)

HOLE No. BH-6-04

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 78 FF 1		C-6		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 78 FF 2		C-7		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
8													
9													
30													
10											End of test hole boring at 30 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Pumped to 7.6, Recharged to 4.9, Pipe in hole 3.5 x 30.0		
35													
11													
12													
40													
13													
45													



LOG OF TEST BORING

Start Card R-65774

Job No. OL-3502

SR 270

Elevation 2481.3 (756.3 m)

HOLE No. BH-7-04

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 21, 2004 Completion January 21, 2004 Well ID# AHP-441

Equipment CME 45 w/ autohammer

Station SSFR 11+79.61

Offset 8.20ft Lt.

Casing 4.5 x 14.0 & 3.5 x 40.0

Method Wet Rotary

Northing 855756.47

Easting 2822718.63

Latitude _____

Longitude _____

County Whitman

Subsection SW 1/4 of NW 1/4

Section 1

Range 45 EWM

Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							3	U-1			No Recovery		
							1	D-2			SILT with gravel, loose, dark brown, wet, Homogeneous,		
2							2				HCl reaction not tested		
							(3)				Length Recovered 0.1 ft		
											3/11/04		
											1/21/2004		
10								U-3			Silty SAND with gravel, loose, brown, wet,		
								A			Homogeneous, HCl reaction not tested		
								B			Length Recovered 1.0 ft		
								C					
4							2	D-4		GS	SW-SM, M.C. =18%		
							3			MC	Well-graded SAND with silt and gravel, loose, brown,		
							5				wet, Homogeneous, HCl reaction not tested		
							(8)				Length Recovered 1.0 ft		
15													
							RQD	C-5			BASALT, dark grey, medium grained, moderately		
							0				weathered, moderately weak rock, HCl reaction not		
5							FF				tested. Discontinuities are closely spaced and in poor		
							8				condition, Percent Recovered 40.0%		
20													



LOG OF TEST BORING

Start Card R-65774

Job No. OL-3502 SR 270

Elevation 2481.3 (756.3 m)

HOLE No. BH-7-04

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 38 FF 4		C-6		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
25							RQD 48 FF 2		C-7		BASALT, dark grey, fine grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 80.0%		
30							RQD 90 FF 0		C-8		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
35							RQD 88 FF 0		C-9		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
40											End of test hole boring at 40 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Pumped to 15.0 Recharged to 8.0		
45													



LOG OF TEST BORING

Start Card S-23957

Job No. OL-3502 SR 270

Elevation 2487.2 (758.1 m)

HOLE No. BH-8-04

Sheet 1 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 18, 2004 Completion January 19, 2004 Well ID# _____ Equipment CME 45 w/ autohammer

Station SSFR 12+49.23 Offset 4.33ft Rt. Casing 3.5 x 41.5 Method Wet Rotary

Northing 855686.57 Easting 2822729.53 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 1 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
1												
5												
2								U-1		No Recovery		
							2	D-2	GS	ML, MC=35%, PI=4 Sandy SILT with gravel and wood chunks, loose, dark brown, wet, Homogeneous, HCl reaction not tested Length Recovered 0.8 ft		
							2		MC			
10							3		AL			
							(5)					
							4	D-3		Elastic SILT with organics and basalt chunks, medium stiff, dark brown, wet, Homogeneous, HCl reaction not tested		
							4			Length Recovered 0.2 ft		
							4					
4							(8)	C-4		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 98.0%		
							RQD					
							80					
							FF					
							1			01/19/2004		
15												
5								C-5		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
							RQD					
							80					
							FF					
							1					
20												
6												



LOG OF TEST BORING

Start Card S-23957

Job No. OL-3502

SR 270

Elevation 2487.2 (758.1 m)

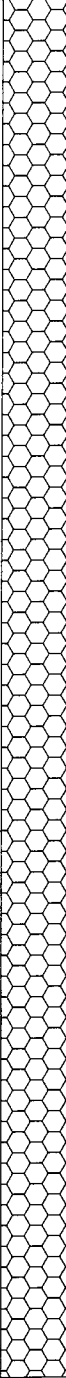
HOLE No. BH-8-04

Sheet 2 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 16 FF 3		C-6		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 74.0%		
25													
8							RQD 44 FF 3		C-7		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
9													
30													
10							RQD 58 FF 3		C-8		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
35													
11													
40							RQD 40 FF 3		C-9		BASALT, dark grey, medium grained, slightly weathered, moderately strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
12													
13							RQD 68 FF 1		C-10		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
45													



LOG OF TEST BORING

Start Card S-23957

Job No. OL-3502

SR 270

Elevation 2487.2 (758.1 m)

HOLE No. BH-8-04

Sheet 3 of 3

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 46.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Bailed to 20.6 Recharged 14.0 overnight		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502 SR 270

Elevation 2517.0 (767.2 m)

HOLE No. BH-9-03

Sheet 1 of 4

Project Pullman to Moscow (Structures)

Driller J. Fetterly Lic# 2708

Site Address _____

Inspector Ybarra

Start December 16, 2003 Completion December 17, 2003

Well ID# _____ Equipment CME 850 w/ autohammer

Station AEFR12 15+92.8 Offset 2ft Rt. Casing 4" x 80' Method Wet Rotary

Northing 859501.83 Easting 2832085.31 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of SE 1/4 Section 31 Range 46 e. Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							2		D-1	GS	CH, MC=21%, PI=30 Fat CLAY, medium stiff, dark gray, moist, Homogeneous, no HCl reaction, Surface is grassy wet land. Length Recovered 1.5 ft, Length Retained 1.0 ft		
5							2			MC			
							3			AL			
							(5)						
2													
3							1		D-2	GS	ML, MC=33% Sandy SILT, loose, gray, moist, Stratified, no HCl reaction, bottom 6" change to sand with gravel, wet. Length Recovered 1.5 ft, Length Retained 1.0 ft		
10							3			MC			
							4			AL			
							(7)						
4									C-3		Well graded GRAVEL with sand, subrounded, dense, dark gray, wet, Homogeneous, no HCl reaction, bag sample. Length Recovered 1.0 ft, Length Retained 1.0 ft		
15									C-4		BASALT, dark gray, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, highly vesicular., Percent Recovered 100.0%		
5							RQD						
							50						
							FF						
							4						
6													
20													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2517.0 (767.2 m)

HOLE No. BH-9-03

Sheet 2 of 4

Project Pullman to Moscow (Structures)

Driller J. Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							RQD 100 FF 0		C-5		BASALT, gray, medium grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, highly vesicular., Percent Recovered 100.0%		
7													
25							RQD 100 FF 0		C-6		BASALT, gray, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
8													
9													
30							RQD 97 FF 0		C-7		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
10													
35							RQD 100 FF 0		C-8		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
11													
12													
40							RQD 100 FF 0		C-9		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
13													
45													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2517.0 (767.2 m)

HOLE No. BH-9-03

Sheet 3 of 4

Project Pullman to Moscow (Structures)

Driller J. Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 100 FF 0		C-10		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
15													
50							RQD 100 FF 0		C-11		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
16													
55													
17							RQD 100 FF 0		C-12		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
18													
60							RQD 100 FF 0		C-13		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
19													
65													
20							RQD 100 FF 0		C-14		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
21													
70													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502 SR 270

Elevation 2517.0 (767.2 m)

HOLE No. BH-9-03

Sheet 4 of 4

Project Pullman to Moscow (Structures)

Driller J. Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
22							RQD 100 FF 0		C-15		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
75							RQD 100 FF 0		C-16		BASALT, gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, end of boring., Percent Recovered 100.0%		
23													
24													
80													
25											End of test hole boring at 80 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
85													
26													
27													
90													
28													
95													

LOG OF TEST BORING

Start Card R 65775

Job No. OL-3502 SR 270 Elevation 2520.0 (768.1 m)

HOLE No. BH-10-03

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller J. Fetterly Lic# 2708

Site Address _____

Inspector Ybarra

Start December 19, 2003 Completion December 19, 2003 Well ID# AHP-442 Equipment CME 850 w/ autohammer

Station AEFR12 16+88.1 Offset 9.7ft Rt. Casing 4" x 25' Method Wet Rotary

Northing 859437.67 Easting 2832156.33 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of SE 1/4 Section 31 Range 46 e. Township 15

[illegible]



LOG OF TEST BORING

Start Card R 65775

Job No. OL-3502

SR 270

Elevation 2520.0 (768.1 m)


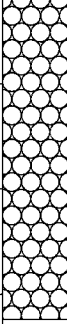
HOLE No. BH-10-03

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller J. Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 100 FF 0		C-7		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, vesicular. One fracture in 5', install piezo., Percent Recovered 100.0%		
25											End of test hole boring at 25 ft below ground elevation. Water at 5', bail to 24' recharge to 17' in 4 minutes to 9' in 20 minutes after install at 5.6' BGS. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed water level, stablized at 7.8 ft in 1 hour		
8													
9													
30													
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2542.0 (774.8 m)

HOLE No. BH-11-03

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller J. Fetterly Lic# 2708

Site Address _____

Inspector Ybarra

Start December 18, 2003 Completion December 18, 2003

Well ID# _____

Equipment CME 850 w/ autohammer

Station AERF12 17+86.7

Offset 35.5ft Rt.

Casing 4" x 39.5

Method Wet Rotary

Northing 859357.18

Easting 2832218.62

Latitude _____

Longitude _____

County Whitman

Subsection SE 1/4 of SE 1/4

Section 31

Range 16 e.

Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									C-1		Silty GRAVEL, subrounded, medium dense, gray, moist, Stratified, no HCl reaction, 0-1.5 silt, 1.5 to 4 basalt gravel, 4' top of rock. Boring is approx. 9' higher than staked location. Length Recovered 3.0 ft, Length Retained 3.0 ft		
5							RQD 20 FF 3		C-2		BASALT, brownish gray, medium grained, slightly weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, fractures are open, and closed with silty infilling. 0 to 45 degrees., Percent Recovered 100.0%		
10							RQD 40 FF 2		C-3		BASALT, dark olive gray, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, slightly vesicular, fractures are open, and closed with silty infilling, 10 to 30 degrees. Separates easily., Percent Recovered 95.0%		
15							RQD 70 FF 2		C-4		BASALT, dark gray, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, vesicular, fractures open, and closed, 20 to 45 degrees., Percent Recovered 100.0%		
20							RQD		C-5		BASALT, dark gray, medium grained, slightly weathered,		

12/19/2003



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2542.0 (774.8 m)

HOLE No. BH-11-03

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller J. Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							79 FF 2				strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, slightly vesicular., Percent Recovered 100.0%		
7													
25							RQD 100 FF 1		C-6		BASALT, dark gray, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, vesicular., Percent Recovered 100.0%		
8													
30							RQD 100 FF 0		C-7		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
9													
10													
35							RQD 100 FF 0		C-8		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, next day water at - 18'. Percent Recovered 100.0%		
11													
12													
40											End of test hole boring at 39.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
13													
45													



LOG OF TEST BORING

Start Card R65775

Job No. OL-3502

SR 270

Elevation 2519.1 (767.8 m)

HOLE No. BH-12-03

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly Lic# 2708

Site Address _____

Inspector Dan Reed

Start December 21, 2003 Completion December 21, 2003 Well ID# AHP 443

Equipment CME 850 w/ autohammer

Station AEFR2 14+76.4

Offset 4.1ft Lt.

Casing HW 4.5" and HQ 3.5"

Method Wet Rotary

Northing 859389.46

Easting 2832644.527

Latitude _____

Longitude _____

County Whitman Subsection SE 1/4 of the SE 1/4

Section 31

Range 46 EWM

Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							1 1 1 (2)	U-1 A B C D D-2		GS MC AL	Lean CLAY, trace of organic, soft, gray, wet, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft 12/21/2003 CL, MC=37%, PI=25 Lean CLAY, trace of organics, soft, gray, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10							5 7 11 (18) RQD 0 FF 20+	D-3 C-4		GS MC	SW-SM, MC=15% Well graded SAND with silt and gravel, medium dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft BASALT, highly vesicular, medium grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, highly fractured rock, Percent Recovered 50.0%		
15							RQD 70 FF 2	C-5			BASALT, highly vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in poor condition, Percent Recovered 100.0%		
20													



LOG OF TEST BORING

Start Card R65775

Job No. OL-3502

SR 270

Elevation 2519.1 (767.8 m)

HOLE No. BH-12-03

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 20+		C-6		BASALT, highly vesicular, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 90.0%		
25							RQD 92 FF 1.4		C-7		BASALT, slightly vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
8													
9													
30							RQD 100 FF 0		C-8		BASALT, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are very widely spaced and in excellent condition, Percent Recovered 100.0%		
10													
35													
11											End of test hole boring at 35 ft below ground elevation.		
12											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40											Bailed water level, stabilized at 6.5 ft in 1 hour		
13													
45													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2518.8 (767.7 m)

HOLE No. BH-13-03

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly Lic# 2708

Site Address _____

Inspector Dan Reed

Start December 19, 2003 Completion December 19, 2003

Well ID# _____ Equipment CME 850 w/ autohammer

Station AEFR2 15+32.9

Offset 7ft Rt.

Casing HW 4.5" and HQ 3.5"

Method Wet Rotary

Northing 859347.01

Easting 2832605.74

Latitude _____

Longitude _____

County Whitman

Subsection SE 1/4 of the SE 1/4

Section 31

Range 46

Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							2	U-1			Sandy silty CLAY with gravel, medium stiff, gray, moist, Stratified, no HCl reaction, 300 lbs down pressure Length Recovered 2.0 ft, Length Retained 2.0 ft		
							2	A					
							4	B					
							(6)	C					
								D					
								D-2		GS	CL-ML, MC=28%, PI=7		
										MC	Sandy silty CLAY, medium stiff, gray, moist, Stratified, no HCl reaction, organic lenses 6.5 - 7.0'		
										AL	Length Recovered 1.5 ft, Length Retained 1.5 ft 12/19/2003		
10							8						
							14	D-3		GS	SW-SM, MC=15%		
							15			MC	Well graded SAND with silt, dense, light brown, wet, Homogeneous, no HCl reaction, trace of silt contact point 9.0 as indicated by drilling process		
							(29)				Length Recovered 1.5 ft, Length Retained 1.5 ft		
15													
							RQD						
							0	C-4			BASALT, highly vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, contact with rock 11.5', Percent Recovered 85%		
							FF						
							5						
							RQD						
							70	C-5			BASALT, moderately vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, altered zones within rock mass 15.5 - 16.8', Percent Recovered 96.0%		
							FF						
							1						
20													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2518.8 (767.7 m)

HOLE No. BH-13-03

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 80 FF 1.4		C-6		BASALT, slightly vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, Percent Recovered 98.0%		
25													
8											End of test hole boring at 25.5 ft below ground elevation.		
9											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30													
10													
35													
11													
12													
40													
13													
45													

LOG OF TEST BORING

Start Card R-65775

Job No. OL-3502

SR 270

Elevation 2518.6 (767.7 m)HOLE No. BH-14-04

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 14, 2004 Completion January 15, 2004 Well ID# AHP-444

Equipment CME 45 w/ auto hammer

Station AEFR2 16+06.9

Offset 6.7ft Lt.

Casing 4.5 x 15.0 & 3.5 x 35.0

Method Wet Rotary

Northing 859276.84

Easting 2832578.77

Latitude _____

Longitude _____

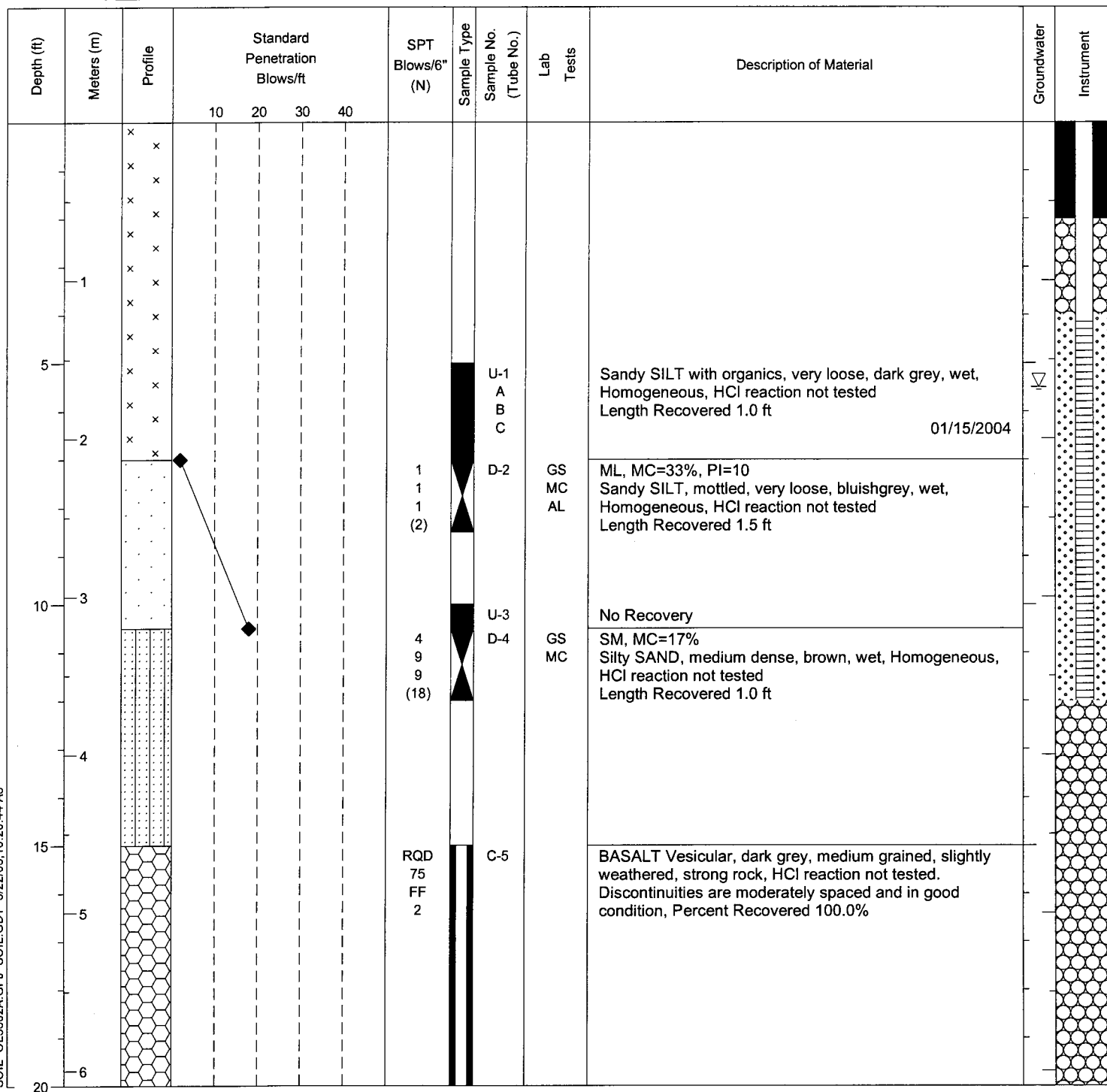
County Whitman

Subsection SE 1/4 of SE 1/4

Section 31

Range 46 EWM

Township 15 N





LOG OF TEST BORING

Start Card R-65775

Job No. OL-3502

SR 270

Elevation 2518.6 (767.7 m)

HOLE No. BH-14-04

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 90 FF 1		C-6		BASALT vesicular, dark grey, medium grained, slightly weathered, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 90 FF 1		C-7		BASALT, dark grey, fine grained, slightly weathered, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
30							RQD 100 FF 0		C-8		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100.0%		
35													
40											End of test hole boring at 35 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Pumped to 5.5 Unable to pump lower, Water coming in to fast Recharged to 5.5		
45													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2520.0 (768.1 m)

HOLE No. BH-15-03

Sheet 1 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly Lic# 2708

Site Address _____

Inspector Dan Reed

Start December 19, 2003 Completion December 19, 2003

Well ID# _____ Equipment CME 850 w/ autohammer

Station AEFR2 16+62.3

Offset 2.8ft Rt.

Casing HW 4.5" and HQ 3.5"

Method Wet Rotary

Northing 859234.22

Easting 2832541.82

Latitude _____

Longitude _____

County Whitman

Subsection SE 1/4 of the SE 1/4

Section 31

Range 46

Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							3 5 5 (10)	U-1 A B C D D-2		GS MC AL	Lean CLAY, stiff, gray, wet, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft CL, MC=31%, PI=14 Lean CLAY, trace of organics, stiff, gray, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft 12/19/2003		
10							2 3 4 (7)	D-3		GS MC AL	ML, MC=29%, PI=9 SILT, loose, gray, wet, Disrupted, no HCl reaction, contact with rock at 11.0' Length Recovered 1.5 ft, Length Retained 1.5 ft		
4							RQD 0 FF 20+	C-4			BASALT, highly vesicular, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, highly fractured rock, Percent Recovered 80.0%		
15							RQD 0 FF 20+	C-5			BASALT, highly vesicular, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, highly fractured rock altered zones 15.5 - 16.5', Percent Recovered 90.0%		
5													
6													
20													



LOG OF TEST BORING

Start Card S-23958

Job No. OL-3502

SR 270

Elevation 2520.0 (768.1 m)

HOLE No. BH-15-03

Sheet 2 of 2

Project Pullman to Moscow (Structures)

Driller James Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 80 FF 2.2		C-6		BASALT, highly vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 47 FF 0.8		C-7		BASALT, moderately vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
8							RQD 94 FF 0.4		C-8		BASALT, slightly vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 98.0%		
30													
35													
11											End of test hole boring at 35.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2597.0 ft (791.6 m)

HOLE No. H-01-01

Sheet 1 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 18, 2001 Completion October 19, 2001 Well ID# _____

Equipment Burly 6500 w/ cathead

Station WBNB1 36+00

Offset _____ Casing HQ x 78.5

Method Wet Rotary

Northing 855787

Easting 2815823 Latitude _____

Longitude _____

County Whitman

Subsection SE - NE

Section 3

Range 45 EWM

Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							6 7 10 (17)	D-1		MC	MC=25% SILT with sand, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10													
3													
4							2 3 5 (8)	D-2			Lean CLAY with sand, soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15													
5													
6							1 3 5 (8)	D-3		GS MC PI	CL, MC=29%, PI=13 Lean CLAY, medium stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20													



LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2597.0 ft (791.6 m)

HOLE No. H-01-01

Sheet 2 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							4 5 7 (12)	D-4			Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25													
8							5 9 9 (18)	D-5		MC	MC=27% Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
9													
30													
10							7 10 12 (22)	D-6			Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
35													
11							7 9 16 (25)	D-7		MC	MC=30% Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
12													
40													
13							5 10 13 (23)	D-8			Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
45													



LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2597.0 ft (791.6 m)

HOLE No. H-01-01

Sheet 3 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14													
							8 9 12 (21)	D-9		GS MC PI	CL, MC=34%, PI=14 Lean CLAY, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15													
50													
							4 6 7 (13)	D-10			Lean CLAY with sand, soft, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
16													
55													
							4 4 10 (14)	D-11		MC	MC=33% Lean CLAY with sand, soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
17													
18													
60													
							7 10 22 (32)	D-12			Lean CLAY with sand, hard, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
19													
65													
							10 18 20 (38)	D-13		MC	MC=31% Lean CLAY with sand, hard, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20													
21													
70													



LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2597.0 ft (791.6 m)

HOLE No. H-01-01

Sheet 4 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
22							6 9 16 (25)	D-14			Lean CLAY with sand, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
75													
23													
24							RQD 0 FF 10	C-15			BASALT with lean clay infilling, medium grained, highly weathered, very weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0% End of test hole boring at 78.5 ft below ground elevation.		
80											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
25													
85													
26													
27													
90													
28													
95													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65778

Job No. OL-3502

SR 270

Elevation 2410.7 ft (734.8 m)

HOLE No. H-01-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo Lic# 2615

Site Address _____

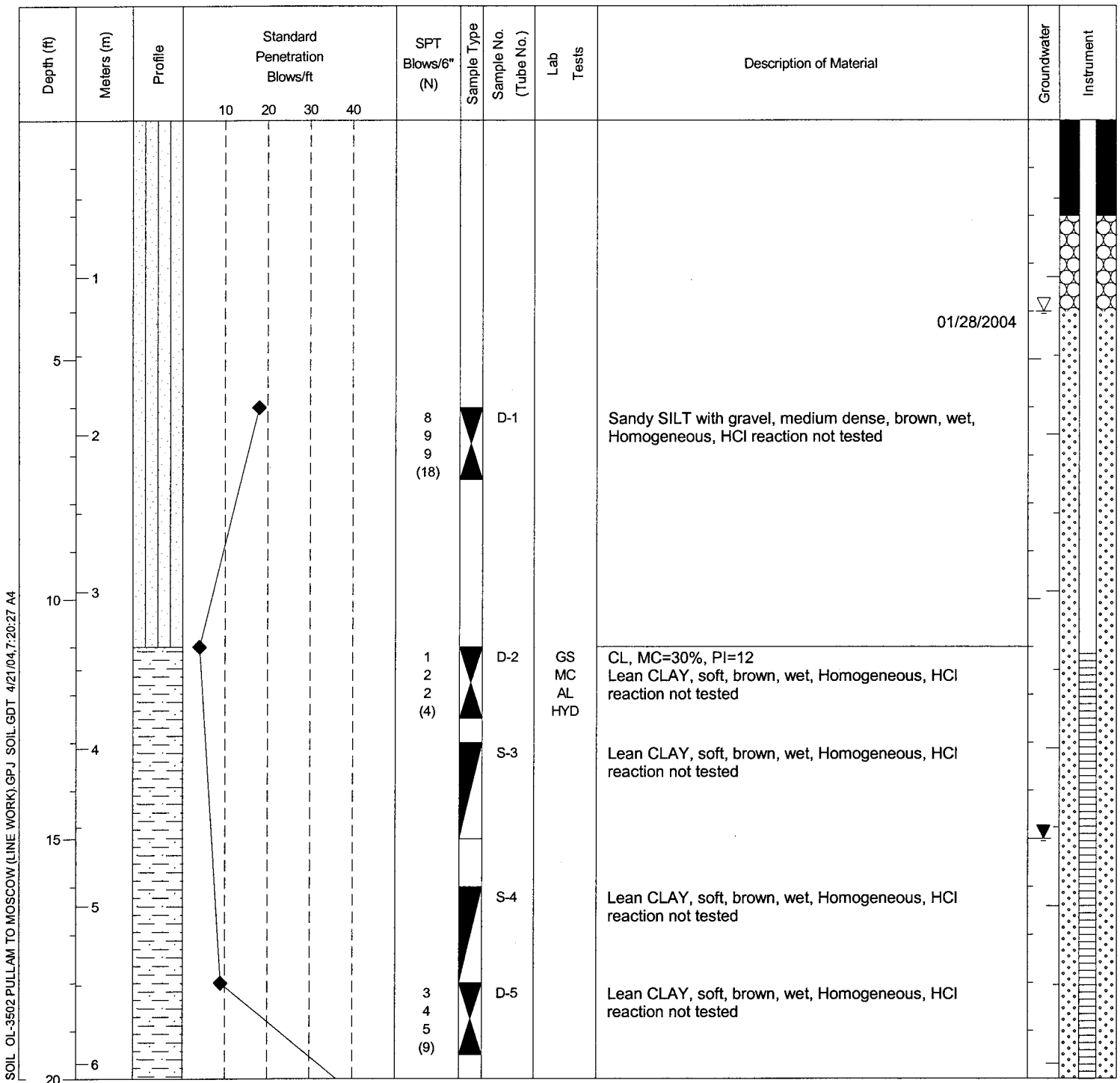
Inspector Dave Nelson

Start January 28, 2004 Completion January 28, 2004 Well ID# AHP-469 Equipment CME 45 w/ autohammer

Station _____ Offset _____ Casing 4.5 x 25.0 Method Wet Rotary

Northing 852406.02 Easting 2808495.03 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of SE 1/4 Section 4 Range 45 EWM Township 14 N





LOG OF TEST BORING

Start Card R-65778

Job No. OL-3502

SR 270

Elevation 2410.7 ft (734.8 m)

HOLE No. H-01-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							16 50/6 (50/6")		D-6		Silty SAND with gravel, very dense, brown, wet, Homogeneous, HCl reaction not tested		
7													
25							100/0 (100/0")		D-7		No Recovery		
8											End of test hole boring at 25 ft below ground elevation. data.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test		
9													
30													
10													
35													
11													
40													
12													
45													
13													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502 SR 270 Elevation 2580.0 ft (786.4 m)

HOLE No. H-02-01

Sheet 1 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 18, 2001 Completion October 18, 2001 Well ID# _____ Equipment Burly 6500 w/ cathead

Station SBWB 114+00 Offset _____ Casing HQ x 80 Method Wet Rotary

Northing 855526 Easting 2815463 Latitude _____ Longitude _____

County Whitman Subsection SE - NE Section 3 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							4 6 9 (15)	D-1			SILT with sand, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10													
3							3 4 5 (9)	D-2		MC	MC=25% Lean CLAY with sand, stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
4													
15													
5							4 4 7 (11)	D-3			Lean CLAY with sand, stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
6													
20													



LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2580.0 ft (786.4 m)

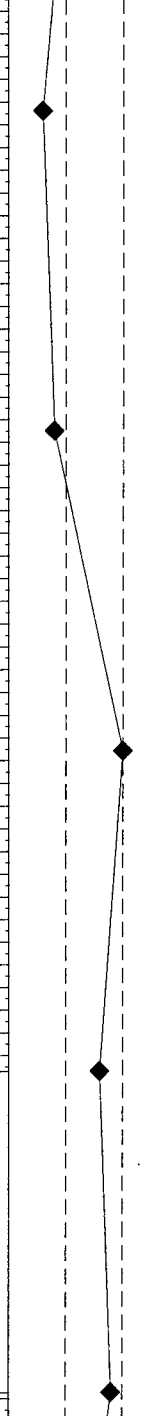
HOLE No. H-02-01

Sheet 2 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10 20 30 40							
7				2 3 3 (6)	D-4	MC	MC=30% Lean CLAY with sand, medium stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft			
25				2 2 6 (8)	D-5		Lean CLAY with sand, medium stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft			
8										
9										
30										
10					4 9 11 (20)	D-6		Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
35										
11					5 7 9 (16)	D-7	GS MC PI	ML, MC=28%, PI=8 SILT, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
12										
40										
13				3 8 10 (18)	D-8		Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft			
45										



LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2580.0 ft (786.4 m)

HOLE No. H-02-01

Sheet 3 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							4 5 6 (11)	▲▼	D-9	MC	MC=29% Lean CLAY with sand, soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15													
50													
16							5 4 4 (8)	▲▼	D-10		Lean CLAY with sand, medium stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
55													
17							RQD 88 FF 1	■	C-11		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
18													
60													
19							RQD 98 FF 1	■	C-12		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
65													
20													
21							RQD 90 FF 1	■	C-13		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09014

Job No. OL-3502

SR 270

Elevation 2580.0 ft (786.4 m)

HOLE No. H-02-01

Sheet 4 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
22							RQD 99 FF 0		C-14		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
75							RQD 92 FF 1		C-15		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
23													
24													
80											End of test hole boring at 80 ft below ground elevation.		
25											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
85													
26													
27													
90													
28													
95													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2462.6 ft (750.6 m)

HOLE No. H-02-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 16, 2003 Completion December 16, 2003 Well ID# _____

Equipment CME 850 w/ autohammer

Station 108 + 25 Offset Main Casing HQ 3" ID x 65.0'

Method Wet Rotary

Northing 852418.69 Easting 2810883.49 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the SE 1/4 Section 4 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							2		D-1		SILT, loose, dark brown, moist, Stratified, no HCl reaction		
							2						
							3						
							(5)						
							RQD		C-1		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very widely spaced and in poor condition, (100 % drilling fluid return), Percent Recovered 71.0%		
							0						
							FF						
							26						
1													
5							RQD		C-3		BASALT, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, silt infilling, Percent Recovered 100.0%		
							0						
							FF						
							26						
2													
10							RQD		C-4		BASALT, moderately fractured, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
							0						
							FF						
							26						
4													
15							RQD		C-5		BASALT, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
							35						
							FF						
							12						
5													
6													
20													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2462.6 ft (750.6 m)

HOLE No. H-02-03

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 45 FF 8		C-6		BASALT, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
25							RQD 66 FF 3		C-7		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 26 FF 16		C-8		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
9													
35							RQD 30 FF 16		C-9		BASALT, highly fractured with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
10													
40							RQD 18 FF 18		C-10		BASALT, highly fractured with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
11													
12													
13													
45													



LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2462.6 ft (750.6 m)

HOLE No. H-02-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 70 FF 13		C-11		BASALT, moderately fractured with iron mineralization, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
15													
50							RQD 73 FF 5		C-12		BASALT, slightly vesicular, moderately fractured, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
16													
55													
17							RQD 33 FF 8		C-13		BASALT, moderately fractured, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
18													
60											End of test hole boring at 60 ft below ground elevation.		
19											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09018

Job No. OL-3502

SR 270

Elevation 2556.0 ft (779.1 m)

HOLE No. H-03-01

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 23, 2001 Completion October 23, 2001 Well ID# _____

Equipment Burly 4500 w/ cathead

Station _____ Offset _____ Casing HQ x 25.0

Method Wet Rotary

Northing 859212 Easting 2832129 Latitude _____

Longitude _____

County Whitman Subsection SE - SE Section 31 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							4 5 8 (13)	D-1		MC	MC=24% SILT with sand, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10							14 50 (50) RQD 50 FF 1	D-2 C-3			Sandy SILT with gravel, very dense, brown/black, wet, Homogeneous, no HCl reaction Length Recovered 0.7 ft BASALT, medium grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, clay infilling, Percent Recovered 100.0%		
4													
15													
5							RQD 44 FF 2	C-4			BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, clay infilling, Percent Recovered 100.0%		
6													
20													



LOG OF TEST BORING

Start Card S-09018

Job No. OL-3502 SR 270

Elevation 2556.0 ft (779.1 m)

HOLE No. H-03-01

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 68 FF 2		C-5		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25											End of test hole boring at 25 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
8													
9													
30													
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502 SR 270

Elevation 2464.7 ft (751.2 m)

HOLE No. H-03-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start December 11, 2003 Completion December 11, 2003 Well ID# _____ Equipment CME 850 w/ autohammer

Station 112+25 Offset main Casing HQ 3.5/HW 4.5 Method Wet Rotary

Northing 852410.24 Easting 2811189.29 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the SE 1/4 Section 4 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 76 FF 1.6		C-1		BASALT, slightly vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, soil depth 1.2', Percent Recovered 58%		
5							RQD 96 FF 1.6		C-2		BASALT, slightly vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 58%		
10							RQD 98 FF 1.6		C-3		BASALT, slightly vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 80%		
15							RQD 100 FF .6		C-4		BASALT, slightly vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 94%		
20													



LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2464.7 ft (751.2 m)

HOLE No. H-03-03

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 98 FF .6		C-5		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 98%		
25							RQD 100 FF .6		C-6		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
8													
30							RQD 100 FF .4		C-7		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
9													
35							RQD 100 FF .8		C-8		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
10													
40							RQD 100 FF 0		C-9		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
11													
45													
12													
13													



LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2464.7 ft (751.2 m)

HOLE No. H-03-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 100 FF .4		C-10		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
15													
50							RQD 100 FF 0		C-11		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
16													
55													
17							RQD 100 FF .4		C-12		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 98%		
18													
60							RQD 100 FF 1		C-13		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100%		
19											End of test hole boring at 61.5 ft below ground elevation.		
65											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09017

Job No. OL-3502 SR 270

Elevation 2573.0 ft (784.3 m)

HOLE No. H-04-01

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 23, 2001 Completion October 23, 2001 Well ID# _____ Equipment Burly 4500 w/ cathead

Station _____ Offset _____ Casing HQ x 35.0 Method Wet Rotary

Northing 858895 Easting 2832716 Latitude _____ Longitude _____

County Whitman Subsection SW - SW Section 32 Range 46 EWM Township 15 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							1 1 4 (5)	D-1		MC	MC=24% Lean CLAY with sand, medium stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10							1 0 3 (3)	D-2		GS MC PI	CL, MC=25%, PI=39 Lean CLAY, soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15													
5							2 4 5 (9)	D-3			Lean CLAY with sand, stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20													



LOG OF TEST BORING

Start Card S-09017

Job No. OL-3502

SR 270

Elevation 2573.0 ft (784.3 m)

HOLE No. H-04-01

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							>>◆						
							6 12 44 (56) RQD 0 FF 5		D-4		Sandy SILT, very dense, brown/black, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
7									C-5		BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, clay infilling, Percent Recovered 100.0%		
25													
8							RQD 32 FF 2		C-6		BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, clay infilling miss latch, ground rock away, Percent Recovered 68.0%		
30													
9													
35													
10							RQD 0 FF 10		C-7		BASALT, medium grained, slightly weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 59.0%		
11											End of test hole boring at 35 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2443.1 ft (744.7 m)

HOLE No. H-04-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 17, 2003 Completion December 17, 2003 Well ID# _____ Equipment CME 850 w/ autohammer

Station 124 + 00 Offset Main Casing HQ 3" ID x 55.0' Method Wet Rotary

Northing 852461.37 Easting 2811956.08 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the SE 1/4 Section 4 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
							1 2 2 (4)	D-1		SILT, very loose, dark brown, moist, Stratified, no HCl reaction		
1								C-2		SILT with pieces of basalt rock, very loose, dark brown, moist, Stratified, no HCl reaction		
5							RQD 15 FF 17	C-3		BASALT, highly fractured with with silt infilling, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
2												
10							RQD 93 FF 2	C-4		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
4												
15							RQD 76 FF 5	C-5		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
5												
20							RQD	C-6		BASALT, fine grained, fresh, very strong rock, no HCl		
6												



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2443.1 ft (744.7 m)

HOLE No. H-04-03

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							88 FF 2				reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
7													
25							RQD 86 FF 3		C-7		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 93 FF 1		C-8		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
9													
10													
35							RQD 78 FF 2		C-9		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
11													
40							RQD 60 FF 8		C-10		BASALT with iron mineralization, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
12													
45							RQD		C-11		BASALT, fine grained, fresh, very strong rock, no HCl		
13													



LOG OF TEST BORING

Start Card S 23884

Job No. OL-3502

SR 270

Elevation 2443.1 ft (744.7 m)

HOLE No. H-04-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							91 FF 2				reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
15													
50											End of test hole boring at 49.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09010

Job No. OL-3502

SR 270

Elevation 2523.0 ft (769.0 m)

HOLE No. H-05-01

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 25, 2001 Completion October 25, 2001 Well ID# _____ Equipment Burly 4500 w/ cathead

Station LL2 74+00 Offset 75' Lt. Casing HQ x 30.0 Method Wet Rotary

Northing 852473 Easting 2808891 Latitude _____ Longitude _____

County Whitman Subsection SW - SE Section 4 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 23 FF 2		C-1		BASALT, fine grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, sand infilling, Percent Recovered 100.0%		
5							RQD 60 FF 2		C-2		BASALT with sand infilling, fine grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
10							RQD 50 FF 2		C-3		BASALT, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
15							RQD 60 FF 3		C-4		BASALT with sand infilling, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
20													



LOG OF TEST BORING

Start Card S-09010

Job No. OL-3502

SR 270

Elevation 2523.0 ft (769.0 m)

HOLE No. H-05-01

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 53 FF 3		C-5		BASALT with sand infilling, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 86 FF 1		C-6		BASALT, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
8													
30											End of test hole boring at 30 ft below ground elevation.		
10											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35													
11													
40													
12													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23885

Job No. OL-3502

SR 270

Elevation 2460.4 ft (749.9 m)

HOLE No. H-05-03

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 18, 2003 Completion December 18, 2003 Well ID# _____ Equipment CME 850 w/ autohammer

Station 127 + 00 Offset _____ Casing HQ 3" ID x 45.0' Method Wet Rotary

Northing 852494.76 Easting 2818055.78 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of the SW 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							1 3 10 (13) RQD 0 FF 20		D-1		Silty GRAVEL with sand, subangular, medium dense, dark brown, moist, Stratified, no HCl reaction		
1									C-2		BASALT, highly fractured with silt infilling, fine grained, moderately weathered, very strong rock, no HCl reaction. Discontinuities are moderately spaced and in poor condition, (100 % drilling fluid return), Percent Recovered 86.0%		
5							RQD 0 FF 20		C-3		BASALT, highly fractured with sandy silt infilling, fine grained, moderately weathered, very strong rock, no HCl reaction. Discontinuities are very widely spaced and in poor condition, Percent Recovered 50.0%		
2													
10							RQD 33 FF 11		C-4		BASALT, moderately fractured with sandy silt infilling, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
4													
15							RQD 60 FF 7		C-5		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
5													
20													
6													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23885

Job No. OL-3502

SR 270

Elevation 2460.4 ft (749.9 m)

HOLE No. H-05-03

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 17		C-6		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, 100 % drilling fluid return. Percent Recovered 100.0%		
25							RQD 45 FF 5		C-7		BASALT with iron mineralization, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
30							RQD 96 FF 1		C-8		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
35							RQD 75 FF 5		C-9		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
40											End of test hole boring at 40 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09011

Job No. OL-3502

SR 270

Elevation 2491.0 ft (759.3 m)

HOLE No. H-06-01

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 24, 2001 Completion October 24, 2001 Well ID# _____ Equipment Burly 4500 w/ cathead

Station LL2 130+00 Offset _____ Casing HQ x 45.0 Method Wet Rotary

Northing 852629 Easting 2812450 Latitude _____ Longitude _____

County Whitman Subsection SW - SW Section 3 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							1 10 11 (21)	D-1		MC	MC=35% Lean CLAY with gravel, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10													
3													
							7 21 50 (71)	D-2			Silty SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
4								C-3			Silty SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 3.5 ft		
15													
5								C-4			Silty SAND with gravel, very dense, black, moist, Homogeneous, no HCl reaction Length Recovered 5.0 ft		
6													
20													



LOG OF TEST BORING

Start Card S-09011

Job No. OL-3502

SR 270

Elevation 2491.0 ft (759.3 m)

HOLE No. H-06-01

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 10 FF 8		C-5		BASALT, medium grained, highly weathered, very weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, clay infilling, Percent Recovered 100.0%		
25							RQD 15 FF 4		C-6		BASALT, medium grained, highly weathered, very weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
8													
9									C-7		No Recovery		
30													
10													
35							50 (50) RQD 4 FF 5		D-8 C-9		No Recovery BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
11													
40							RQD 60 FF 1		C-10		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, sand infilling, Percent Recovered 100.0%		
12													
13													
45													



LOG OF TEST BORING

Start Card S-09011

Job No. OL-3502

SR 270

Elevation 2491.0 ft (759.3 m)

HOLE No. H-06-01

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													

LOG OF TEST BORING

Start Card R-65776

Job No. OL-3502 SR 270

Elevation 2476.0 ft (754.7 m)

HOLE No. H-06-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 19, 2003 Completion December 19, 2003 Well ID# AHP-451

Equipment CME 850 w/ autohammer

Station 12 + 00 Offset Casing HQ x 50.0'

Method Wet Rotary

Northing 852462.31

Easting 2812669.86

Latitude

Longitude

County Whitman

Subsection SW 1/4 of the SW 1/4

Section 3

Range 45 EWM

Township 14

[illegible]



LOG OF TEST BORING

Start Card R-65776

Job No. OL-3502

SR 270

Elevation 2476.0 ft (754.7 m)

HOLE No. H-06-03

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 28 FF 16		C-6		BASALT, moderately vesicular, calcite infilling, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25							RQD 61 FF 3		C-7		BASALT with calcite infilling and iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
8													
30							RQD 55 FF 6		C-8		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
9													
10													
35							RQD 61 FF 3		C-9		BASALT with calcite infilling and iron mineralization, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
11													
40							RQD 56 FF 4		C-10		BASALT with iron mineralization, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
12													
13													
45													



LOG OF TEST BORING

Start Card R-65776

Job No. OL-3502

SR 270

Elevation 2476.0 ft (754.7 m)

HOLE No. H-06-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail Test: Bailed water table to depth of 35.0'. Recharged and stabilized at depth of 15.2 after 15 minutes. (Next day reading same)		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													

LOG OF TEST BORING

Start Card S-09012

Job No. OL-3502 SR 270 Elevation 2516.0 ft (766.9 m)

HOLE No. H-07-01

Sheet 1 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 17, 2001 Completion October 17, 2001 Well ID# _____ Equipment Burly 6500 w/ cathead

Station _____ Offset _____ Casing HQ x 70 Method Wet Rotary

Northing 853713 Easting 2814503 Latitude _____ Longitude _____

County Whitman Subsection NE - SW Section 3 Range 45 EWM Township 14 N

[illegible]



LOG OF TEST BORING

Start Card S-09012

Job No. OL-3502

SR 270

Elevation 2516.0 ft (766.9 m)

HOLE No. H-07-01

Sheet 2 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10 20 30 40							
7				2 3 4 (7)	D-4		MC	MC=28% Lean CLAY with sand, medium stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25										
8				3 5 7 (12)	D-5		GS MC PI	CL, MC=23%, PI=15 Lean CLAY, stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
9										
30										
10				2 1 3 (4)	D-6		MC	MC=37% Lean CLAY with sand, soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
35										
11				RQD 0 FF 10	C-7			BASALT with lean clay infilling, medium grained, highly weathered, very weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
				RQD 0 FF 10	C-8			BASALT, medium grained, slightly weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
12										
40										
13				RQD 40 FF 4	C-9			BASALT, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
45										



LOG OF TEST BORING

Start Card S-09012

Job No. OL-3502

SR 270

Elevation 2516.0 ft (766.9 m)

HOLE No. H-07-01

Sheet 3 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 94 FF 1		C-10		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
15													
50													
16							RQD 84 FF 1		C-11		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
55													
17													
18							RQD 84 FF 1		C-12		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
60													
19							RQD 98 FF 0		C-13		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
65													
20													
21							RQD 97 FF 0		C-14		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09012

Job No. OL-3502

SR 270

Elevation 2516.0 ft (766.9 m)

HOLE No. H-07-01

Sheet 4 of 4

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
22											End of test hole boring at 70 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
75													
23													
24													
80													
25													
85													
26													
27													
90													
28													
95													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65777

Job No. OL-3502 SR 270

Elevation 2493.5 ft (760.0 m)

HOLE No. H-07-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

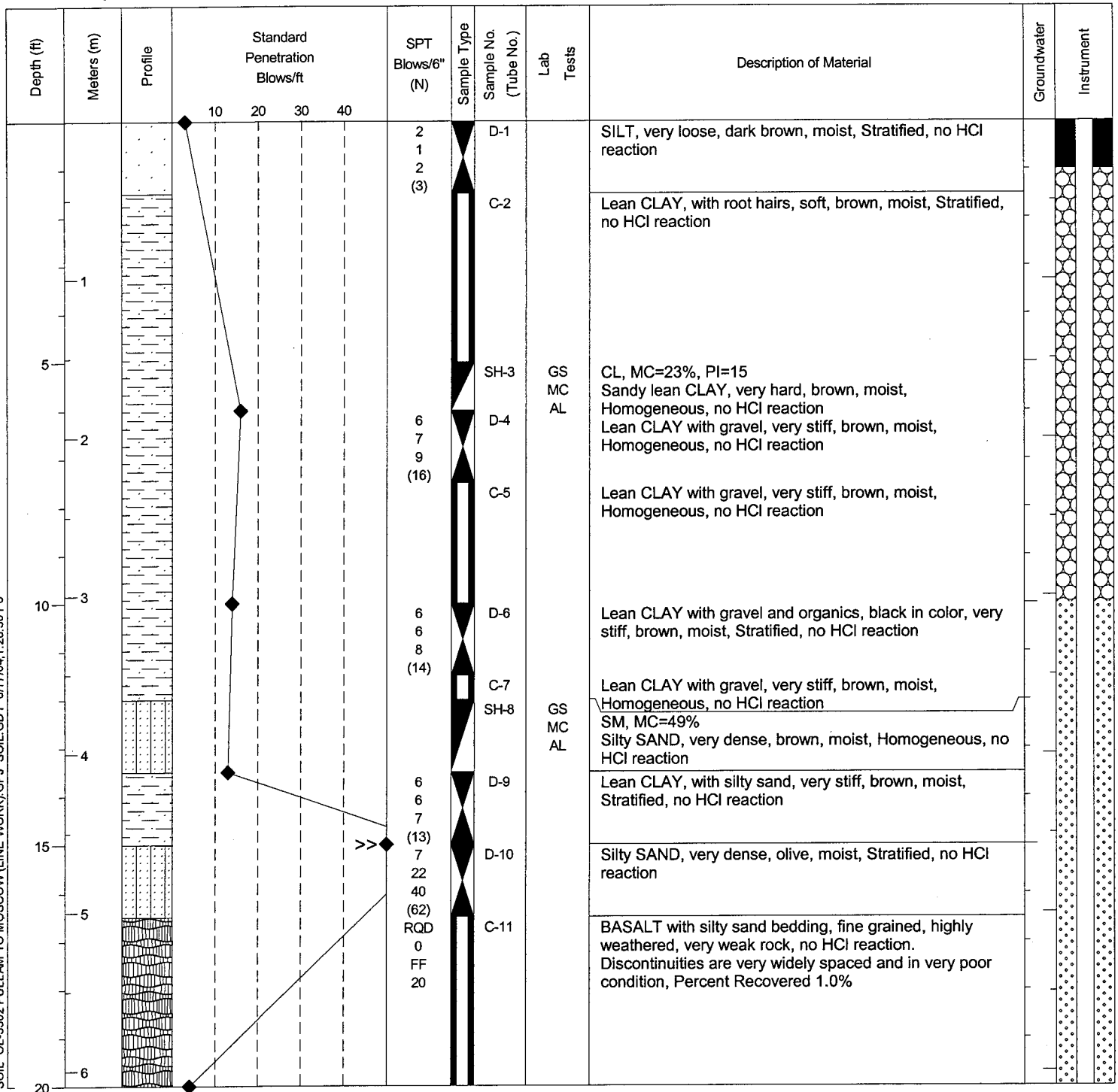
Inspector Cleo Andrews

Start December 19, 2003 Completion December 20, 2003 Well ID# AHP-452 Equipment CME 850 w/ autohammer

Station 135 + 00 Offset Main Casing HQ x 55.0' Method Wet Rotary

Northing 852780.55 Easting 2812922.93 Latitude _____ Longitude _____

County Whitman Subsection NE 1/4 of the SW 1/4 Section 3 Range 45 EWM Township 14



LOG OF TEST BORING

Start Card R 65777

Job No. OL-3502 SR 270

Elevation 2493.5 ft (760.0 m)

HOLE No. H-07-03

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)				% Rec. FPF	Rock Strength Sample Type	Sample No.	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20	40	60	80							
	7							D-12	2 2 2 (4)	Sandy CLAYEY SILT, very loose, olive gray, moist, Stratified, no HCl reaction			
								SH-13		Sandy Lean CLAY, very stiff, olive gray, moist, Stratified, no HCl reaction			
25	8							D-15	6 8 10 (18)	Silty SAND, medium dense, olive gray, moist, Laminated, no HCl reaction			
								C-16		Silty SAND, medium dense, olive gray, moist, Laminated, no HCl reaction			
								D-17	9 10 12 (22)	Silty SAND, medium dense, olive gray, moist, Laminated, no HCl reaction Silty SAND, medium dense, olive gray, moist, Laminated, no HCl reaction			
								C-18	RQD 0 FF 20	BASALT, highly fractured, fine grained, completely weathered, very weak rock, no HCl reaction. Discontinuities are widely spaced and in very poor condition, Percent Recovered 71.0%			
30	9							D-19	9 15 19 (34)	Silty SAND, dense, olive gray, moist, Stratified, no HCl reaction			
								C-20	RQD 0 FF 20	BASALT, iron mineralization, vesicular, fine grained, moderately weathered, very strong rock, no HCl reaction. Discontinuities are widely spaced and in very poor condition, Percent Recovered 46.0%			
	10							D-21	10 11 21 (33)	Silty SAND, dense, medium dark gray, moist, Stratified, no HCl reaction			
								C-22	RQD 0 FF 20	BASALT with iron mineralization, fine grained, completely weathered, very weak rock, no HCl reaction. Discontinuities are widely spaced and in very poor condition, (Note : Caliche are yellowish orange and pink in color and iron mineral are dark reddish brown and black in color)., Percent Recovered 46.0%			
35	11							D-23	100/1 (100/1")	No Recovery			
								C-24	RQD 0 FF 20	BASALT with iron mineral infilling, fine grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are widely spaced and in poor condition, Percent Recovered 80.0%			
40	12												
45	13												



LOG OF TEST BORING

Start Card R 65777

Job No. OL-3502

SR 270

Elevation 2493.5 ft (760.0 m)


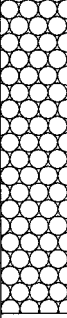
HOLE No. H-07-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)				% Rec FPF	Rock Strength	Sample Type	Sample No.	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20	40	60	80								
14							80 20			C-25	RQD 0 FF 20	BASALT with iron mineral infilling, fine grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are widely spaced and in poor condition, Percent Recovered 80.0%		
15														
50														
16												<p>End of test hole boring at 50 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail Test: Bailed water table to depth of 36.5'. Recharged and stabilized at depth of 37.0' after overnight. NOTES: Moisture/Density are; S-3 Unit Weight Wet=119.7pcf and Dry=97.3pcf S-8 Unit Weight Wet=105.8pcf and Dry=71.5pcf</p>		
55														
17														
18														
60														
19														
65														
20														
21														
70														



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09013

Job No. OL-3502

SR 270

Elevation 2574.0 ft (784.6 m)

HOLE No. H-08-01

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 17, 2001 Completion October 18, 2001 Well ID# _____ Equipment Burly 6500 w/ cathead

Station LL 164+00 Offset _____ Casing HQ x 37.0 Method Wet Rotary

Northing 854681 Easting 2815097 Latitude _____ Longitude _____

County Whitman Subsection SW - NE Section 3 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2													
							5 6 10 (16)	D-1		MC	MC=21% SILT with sand, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10													
							2 2 4 (6)	D-2			Lean CLAY with sand, medium stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
4													
15													
5							4 6 9 (15)	D-3		MC	MC=26% Lean CLAY with sand, stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04 8:29:50 A4



LOG OF TEST BORING

Start Card S-09013

Job No. OL-3502

SR 270

Elevation 2574.0 ft (784.6 m)

HOLE No. H-08-01

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							6 9 13 (22)	D-4			Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25													
8							2 6 9 (15)	D-5		GS MC PI	CL, MC=21%, PI=24 Lean CLAY, soft, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
30													
9													
35													
10							3 5 11 (16)	D-6			Lean CLAY with sand, very stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
40													
11													
45							3 5 9 (14)	D-7		MC	MC=29% Lean CLAY with sand, stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
12											End of test hole boring at 38.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
13													



LOG OF TEST BORING

Start Card S 23886

Job No. OL-3502

SR 270

Elevation 2470.3 ft (753.0 m)

HOLE No. H-08-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 21, 2003 Completion December 21, 2003 Well ID# _____ Equipment CME 850 w/ autohammer

Station 144 + 00 Offset Main Casing HQ 3" ID x 55.0' Method Wet Rotary

Northing 853122.43 Easting 2813808.06 Latitude _____ Longitude _____

County Whitman Subsection NE 1/4 of the SW 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10 20 30 40							
				1 1 2 (3)	D-1			SILT, very loose, dark brown, moist, Stratified, no HCl reaction		
					C-2			SILT, very loose, brown, moist, Homogeneous, no HCl reaction		
1										
5				3 3 3 (6)	D-3			SILT, loose, brown, dry, Homogeneous, no HCl reaction		
2					SH-4		GS MC AL	ML, M.C. = N/A, LL = 26 at 8.6' SILT with sand, soft, brown, moist, Homogeneous, no HCl reaction		
					SH-5		GS MC AL	ML, M.C. = 27%, PI = 4 at 9.8' Sandy SILT		
10								ML, M.C. = 32%, PI = 6 at 10.1' SILT with sand		
				2 2 3 (5)	D-6			CL-ML, M.C. = 29%, PI = 7 at 10.6' Silty CLAY with sand, soft, brown, moist, Homogeneous, no HCl reaction Lean CLAY, very soft, brown, moist, Homogeneous, no HCl reaction		
4					D-7			Lean CLAY, very soft, brown, moist, Homogeneous, no HCl reaction		
15				1 1 2 (3)						
5										
				1 1	D-8			Lean CLAY, very soft, brown, moist, Homogeneous, no HCl reaction		
20										



Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							1 (2)						
25							7 8 18 (25)	D-9			Lean CLAY with gravel, hard, brown, moist, Homogeneous, no HCl reaction		
30							>>						
9							65/6 (65/6") RQD 0 FF 1 RQD 90 FF 2	D-10 C-11 C-12	GS MC		SW-SM, M.C. = 11% Clayey GRAVEL with sand, subangular, very dense, brownish gray, moist, Homogeneous, no HCl reaction BASALT, highly vesicular, iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 0.5% BASALT, highly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
10													
35							RQD 85 FF 1	C-13			BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
11													
40													
12													
45													
13													
							RQD 86 FF 1	C-14			BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		



LOG OF TEST BORING

Start Card S 23886

Job No. OL-3502

SR 270

Elevation 2470.3 ft (753.0 m)


HOLE No. H-08-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 100 FF 0		C-15		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are very closely spaced and in excellent condition, Percent Recovered 100.0%		
15													
50													
16											End of test hole boring at 50 ft below ground elevation.		
55											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09015

Job No. OL-3502

SR 270

Elevation 2520.0 ft (768.1 m)

HOLE No. H-09-01

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 19, 2001 Completion October 19, 2001 Well ID# _____ Equipment Burly 6500 w/ cathead

Station LL2 188+00 Offset _____ Casing HQ x 65.0 Method Wet Rotary

Northing _____ Easting _____ Latitude _____ Longitude _____

County Whitman Subsection SW - NW Section 2 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							RQD 0 FF 5		C-1 C-2		Basalt, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
3							RQD 3 FF 5				Basalt, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 80.0%		
10													
4							RQD 76 FF 2		C-3		Basalt, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
15													
5													
6							RQD 90 FF 1		C-4		Basalt, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
20													



LOG OF TEST BORING

Start Card S-09015

Job No. OL-3502

SR 270

Elevation 2520.0 ft (768.1 m)

HOLE No. H-09-01

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 50 FF 2		C-5		Basalt, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
25													
8							RQD 90 FF 0		C-6		Basalt, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
9													
30													
10							RQD 76 FF 2		C-7		Basalt, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, silty sand infilling, Percent Recovered 100.0%		
35													
11							RQD 84 FF 1		C-8		Basalt, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
12													
40													
13							RQD 94 FF 0		C-9		Basalt, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
45													

Start Card S-09015

Job No. OL-3502

SR 270

Elevation 2520.0 ft (768.1 m)

HOLE No. H-09-01

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

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Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65777

Job No. OL-3502

SR 270

Elevation 2499.3 ft (761.8 m)

HOLE No. H-09-03

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Cleo Andrews

Start December 22, 2003 Completion December 22, 2003 Well ID# AHP-453 Equipment CME 850 w/ autohammer

Station 146 + 00 Offset Main Casing (HWT 4" x 5.0)(HQ x 40.0') Method Wet Rotary

Northing 853374.99 Easting 2813851.36 Latitude _____ Longitude _____

County Whitman Subsection NE 1/4 of the SW 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
							1 1 1 (2)	D-1		SILT, very loose, dark brown, moist, Stratified, no HCl reaction		
1												
5												
							RQD 0 FF 6	C-2		BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (100 % drilling fluid return), Percent Recovered 100.0%		
2												
10							RQD 0 FF 2	C-3		BASALT, iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
4												
15							RQD 21 FF 11	C-4		BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
5												
20							RQD 41	C-5		BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction.		



LOG OF TEST BORING

Start Card R 65777

Job No OL-3502

SR 270

Elevation 2499.3 ft (761.8 m)

HOLE No. H-09-03

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							FF 5				Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25							RQD 83 FF 2		C-6		BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 50 FF 5		C-7		BASALT, slightly vesicular, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
10											12/23/2003		
35											End of test hole boring at 34 ft below ground elevation.		
11											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40											Bail Test: Bailed water table to depth of 33.0'. Recharged and stabilized at depth of 32.0' after next day reading.		
12													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-09016

Job No. OL-3502

SR 270

Elevation 2585.0 ft (787.9 m)

HOLE No. H-10-01

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury Lic# 2487

Site Address _____

Inspector Dave Nelson

Start October 24, 2001 Completion October 24, 2001 Well ID# _____ Equipment Burly 4500 w/ cathead

Station 331+00 Offset _____ Casing HQ x 55 Method Wet Rotary

Northing 859623 Easting 2830666 Latitude _____ Longitude _____

County Whitman Subsection NE - SE Section 31 Range 46 EWM Township 15 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							5 5 5 (10)	D-1		MC	MC=26% Sandy SILT, medium dense, brown, dry, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10													
3							3 5 7 (12)	D-2			Lean CLAY with sand, stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
4													
15													
5							5 8 16 (24)	D-3		MC	MC=21% Lean CLAY with sand, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK) GPJ SOIL.GDT 4/21/04, 8:40:18 A4



LOG OF TEST BORING

Start Card S-09016

Job No. OL-3502

SR 270

Elevation 2585.0 ft (787.9 m)

HOLE No. H-10-01

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7				22			6 8 12 (20)	D-4			Lean CLAY with sand, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25													
8				22			6 10 12 (22)	D-5		MC	MC=19% Lean CLAY with sand, very stiff, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
30													
9													
30													
10							11 50 (50) RQD 86 FF 1	D-6 C-7			Silty SAND with gravel, very dense, reddish black, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are moderately spaced and in poor condition, sand infilling, Percent Recovered 100.0%		
35													
11							RQD 68 FF 2	C-8			BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, sand infilling, Percent Recovered 100.0%		
40													
12													
40													
13							RQD 68 FF 2	C-9			BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, sand infilling, Percent Recovered 100.0%		
45													



LOG OF TEST BORING

Start Card S-09016

Job No. OL-3502

SR 270

Elevation 2585.0 ft (787.9 m)

HOLE No. H-10-01

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Nick Salisbury

Lic# 2487

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 21 FF 4		C-10		BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, sand infilling, Percent Recovered 100.0%		
15													
50													
16							RQD 45 FF 3		C-11		BASALT, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, Percent Recovered 100.0%		
55													
17											End of test hole boring at 55 ft below ground elevation.		
18											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502 SR 270

Elevation 2522.1 ft (768.7 m)

HOLE No. H-10-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 13, 2004 Completion January 13, 2004 Well ID# AHP454 Equipment CME 850 w/ autohammer

Station 150+00 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 853676.15 Easting 2814116.7 Latitude _____ Longitude _____

County Whitman Subsection NW 1/4 of the SE 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)				% Rec. FPF	Rock Strength Sample Type	Sample No.	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20	40	60	80							
1													
5									D-1	5 11 16 (27)	CL, MC=19%, PI=9 Lean CLAY with sand, stiff, light brown, moist, Disrupted, no HCl reaction		
2													
10									S-2		CL, MC=43%, PI=20 Lean CLAY with sand, stiff, light brown, moist, Disrupted, no HCl reaction (S-2)-WET=118.454pcf, DRY=91.289pcf		
									D-3	6 5 4 (9)			
4													
15									D-4 C-5	59/6 (59/6") RQD 0 FF 20 +	Well graded GRAVEL with sand and silt, angular, very dense, gray, moist, Homogeneous, no HCl reaction, contact with rock at 15.5 BASALT, Moderate vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Highly weathered zone 15.0 to 16.0, Percent Recovered 100.0%		
5							100 20+						
6													
20													



LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502

SR 270

Elevation 2522.1 ft (768.7 m)

HOLE No. H-10-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)				% Rec. FPF	Rock Strength	Sample Type	Sample No.	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20	40	60	80								
7							82 20+			C-6	RQD 54 FF 20 +	BASALT, Moderate Vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Highly weathered zone 20.0 to 21.0. Percent Recovered 82.0%		
25														
8												End of test hole boring at 25 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 18.0 feet. Water table stabilized to 11.0 feet in 1 hour.		
9														
30														
10														
35														
11														
40														
12														
45														
13														



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502

SR 270

Elevation 2545.6 ft (775.9 m)

HOLE No. H-11-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 14, 2004 Completion January 14, 2004 Well ID# AHP455 Equipment CME 850 w/ autohammer

Station 158+50 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 854275.61 Easting 2814717.31 Latitude _____ Longitude _____

County Whitman Subsection NW 1/4 of the SE 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							4 7 7 (14)	D-1		GS MC AL HYD	CL, MC=16%, PI=10 Lean CLAY, stiff, Light Brown, moist, Disrupted, no HCl reaction, Trace Organics		
2													
10								S-2			Lean CLAY, stiff, Light Brown, moist, Disrupted, no HCl reaction		
3							5 6 7 (13)	D-3			Lean CLAY, stiff, Light Brown, moist, no HCl reaction		
4													
15							3 4 6 (10)	D-4		GS MC AL	CL, MC=48%, PI=16 Lean CLAY with sand, stiff, Light Brown, moist, Homogeneous, no HCl reaction		
5													
6							3 4	D-5			Elastic SILT, medium stiff, Light Brown, moist, Homogeneous, no HCl reaction, Trace of Sand		
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK) GPJ SOIL.GDT 4/21/04 8:50:35 A4



Start Card R-65781

SR 270

Elevation 2545.6 ft (775.9 m)HOLE No. H-11-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454[illegible]

SOIL OL-3502 PULLAM TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04,8:50:36 A4



LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502

SR 270

Elevation 2545.6 ft (775.9 m)

HOLE No. H-11-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 76 FF 1.6		C-11		BASALT, Moderately Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, Percent Recovered 50.0%		
15													
50													
16							RQD 100 FF 1		C-12		BASALT, Moderately Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%.		
17													
55													
18											End of test hole boring at 56 ft below ground elevation.		
19											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
60											Bailed bore hole water level to 41.0 ft. water table. Stabilized to 30.1 in 1 hour.		
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502

SR 270

Elevation 2545.8 ft (775.9 m)

HOLE No. H-11A-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 14, 2004 Completion January 14, 2004 Well ID# AHP456 Equipment CME 850 w/ autohammer

Station 158+55 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 854282.87 Easting 2814721.4 Latitude _____ Longitude _____

County Whitman Subsection NW 1/4 of the SE 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2													
10													
3													
4													
15													
5													
6													
20													

01/14/2004



LOG OF TEST BORING

Start Card R-65781

Job No. OL-3502

SR 270

Elevation 2545.8 ft (775.9 m)

HOLE No. H-11A-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7													
25													
8											End of test hole boring at 25 ft below ground elevation.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
9											Bailed bore hole water level to 16.7 ft. water table. Stabilized to 8.0 ft in 1 hour.		
30													
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65782

Job No. OL-3502

SR 270

Elevation 2509.4 ft (764.8 m)

HOLE No. H-12-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 15, 2004 Completion January 15, 2004 Well ID# AHP457

Equipment CME 850 w/ autohammer

Station 171+00 Offset _____ Casing HW-4.5/HQ-3.5

Method Wet Rotary

Northing 854939.06

Easting 2815769.9

Latitude _____

Longitude _____

County Whitman

Subsection SW 1/4 of the NE 1/4

Section 3

Range 45 EWM

Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							3 4 5 (9)		D-1	GS MC AL	ML, MC=19%, PI=7 SILT with sand, loose, Light Brown, moist, Homogeneous, no HCl reaction, Trace Organics		
2													
10									S-2	GS MC AL CU	S-2(A)CL, M.C. = 22%, PI = 10 at 9.8' S-2(B)CL, M.C. = 19%, PI = 19 at 10.1' Lean CLAY with sand, stiff, Light Brown, moist, Homogeneous, no HCl reaction		
3							3 4 6 (10)		D-3		S-2(C)ML, MC=38%, LL=31, NP SILT with sand SILT with trace sand and organics, loose, moist, Homogeneous		
4													
15							5 4 5 (9)		D-4	GS MC AL	ML, MC=38%, LL=31 SILT with sand, loose, Light Brown, moist, Disrupted, no HCl reaction		
5													
6		x x					>> 13 27		D-5		Sandy Elastic SILT with gravel, angular, very hard, Light Brown, moist, Disrupted, no HCl reaction		
20		x x											



LOG OF TEST BORING

Start Card R-65782

Job No. OL-3502

SR 270

Elevation 2509.4 ft (764.8 m)

HOLE No. H-12-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. FPF	Rock Strength Sample Type	Sample No.	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80							
7				$\frac{90}{5}$		C-6	35 (62) RQD 38 FF 5	BASALT, Slightly Vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 90.0%		
25				$\frac{100}{1.2}$		C-7	RQD 66 FF 1.2	BASALT, Slightly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
8										
30				$\frac{100}{.2}$		C-8	RQD 100 FF 0.2	BASALT, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition 01/15/2004		
9										
10										
35										
11								End of test hole boring at 35 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 34.9. Water table stabilized to 30.9 in 1 hour., Percent Recovered 100.0%		
12										
40										
13										
45										



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65782

Job No. OL-3502 SR 270

Elevation 2499.7 ft (761.9 m)

HOLE No. H-13-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 16, 2004 Completion January 16, 2004 Well ID# AHP458 Equipment CME 850 w/ autohammer

Station 171+00 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 854776.24 Easting 2815843.23 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of the NE 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
1												
5							3 4 5 (9)	D-1		SILT, loose, Light Brown, moist, Disrupted, no HCl reaction, Trace Organics		
2												
10							>>	60/6 (60/6") RQD 66 FF 2.4	D-2 C-3	Gravelly SILT with sand, angular, very dense, gray, moist, Homogeneous, no HCl reaction, contact with rock at 9.0 BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
3												
4												
15								RQD 68 FF 2.2	C-4	BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 79.0%		
5												
6												
20												

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04 9:00:08 A4



LOG OF TEST BORING

Start Card R-65782

Job No. OL-3502

SR 270

Elevation 2499.7 ft (761.9 m)

HOLE No. H-13-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7											End of test hole boring at 19 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 12.0 feet. Water table stabilized to 6.3 in 1 hour.		
25													
8													
9													
30													
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502 SR 270 Elevation 2506.8 ft (764.1 m)

HOLE No. H-14-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 17, 2004 Completion January 17, 2004 Well ID# AHP459 Equipment CME 850 w/ autohammer

Station 182+00 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 855122.08 Easting 2816857.03 Latitude _____ Longitude _____

County Whitman Subsection SE-1/4 of the NE-1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							50/6 (50/6") RQD 76 FF 2		D-1 C-2		SILT with gravel, very dense, Light Brown, wet, Homogeneous, no HCl reaction BASALT, Moderately Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
2													
10							RQD 82 FF 2.8		C-3		BASALT, Slightly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
4													
15							RQD 92 FF 1.2		C-4		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
5													
6													
20													

01/17/2004



LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2506.8 ft (764.1 m)

HOLE No. H-14-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 100 FF 0.6		C-5		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 100 FF 0.6		C-6		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100.0%		
8											04/06/2004		
30							RQD 100 FF 0		C-7		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100.0%		
10													
35							RQD 100 FF 0.6		C-8		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100.0%		
11													
40							RQD 100 FF 1		C-9		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 100.0%		
12													
43											End of test hole boring at 43 ft below ground elevation.		
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2506.8 ft (764.1 m)

HOLE No. H-14-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											<p>This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.</p> <p>Bailed bore hole water level to 28.0 feet. Water table stabilized to 13.0 feet in 1 hour.</p>		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2499.9 ft (762.0 m)

HOLE No. H-15-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 19, 2004 Completion January 19, 2004 Well ID# AHP473 Equipment CME 850 w/ autohammer

Station 188+00 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 855132.47 Easting 2817451.61 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the NE 1/4 Section 3 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
		x x x x x					1 1 1 (2)	D-1		Elastic SILT, soft, Light Brown, moist, Homogeneous, no HCl reaction, Trace Organics, Roots. Length Recovered 1.5 ft, Length Retained 1.5 ft		
1							RQD 0 FF 20+	C-2		BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
5							RQD 0 FF 7	C-3		BASALT, Slightly Vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
10							RQD 80 FF 1.8	C-4		BASALT, Slightly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
15							RQD 62 FF 2.4	C-5		BASALT, Slightly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
20												



LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2499.9 ft (762.0 m)

HOLE No. H-15-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 36 FF 4		C-6		BASALT, Slightly Vesicular, medium grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
25							RQD 28 FF 20+		C-7		BASALT, Highly Vesicular, medium grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Highly weathered zone from 24.5 to 28.5., Percent Recovered 100.0%		
8													
9													
30							RQD 40 FF 20+		C-8		BASALT, Highly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
10													
35							RQD 70 FF 1.2		C-9		BASALT, Slightly Vesicular, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
11													
40							RQD 76 FF 1.2		C-10		BASALT, Highly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
12													
13													
45													



LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2499.9 ft (762.0 m)

HOLE No. H-15-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 36.0 feet. Water table stabilized at 31.0 in 1 hour.		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2461.1 ft (750.2 m)

HOLE No. H-16-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 18, 2004

Completion January 18, 2004

Well ID# AHP460

Equipment CME 850 w/ autohammer

Station 70+00

Offset 22' Lt. of F

Casing HW-4.5/HQ-3.5

Method Wet Rotary

Northing 854898.71

Easting 2817234.59

Latitude

Longitude

County WhitmanSubsection **SE-1/4 of the NE-1/4**Section 3

Range 45 EWM

Township 14

[illegible]



LOG OF TEST BORING

Start Card R-65783

Job No. OL-3502

SR 270

Elevation 2461.1 ft (750.2 m)

HOLE No. H-16-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							35 60/6 (60/6") RQD 50 FF 4		D-6 C-7		Well graded SAND with gravel, silt, angular, very dense, Light Brown, wet, Disrupted, no HCl reaction, Contact with rock 22.0 BASALT, Slightly Vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25													
8													
30							RQD 100 FF 0.2		C-8		BASALT, Slightly Vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
9													
10											End of test hole boring at 30 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 27.0 feet. Water table stabilized to 15.0 feet in 1 hour.		
35													
11													
40													
12													
45													
13													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65779

Job No. OL-3502

SR 270

Elevation 2458.1 ft (749.2 m)

HOLE No. H-17-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 27, 2004 Completion January 27, 2004 Well ID# AHP-470 Equipment CME 45 w/ autohammer

Station _____ Offset _____ Casing 4.5 x 12.0 & 3.5 x 36.0 Method Wet Rotary

Northing 854937.7 Easting 2817860.16 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 2 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2													
							0		U-1		Sandy SILT with organics, loose, dark brown, wet, Homogeneous, HCl reaction not tested Length Recovered 0.8 ft		
							2		A				
							3		B				
							(5)		D-2	GS MC AL HYD	CL, MC=23%, PI=18 Lean CLAY, medium stiff, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
10							3						
							7		D-3	GS MC	SM, MC=17% Silty SAND, medium dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
							16						
							(23)						
							RQD		C-4		BASALT, dark grey, medium grained, slightly weathered, moderately weak rock, HCl reaction not tested. Discontinuities are closely spaced and in poor condition, Percent Recovered 75.0%		
4							0						
							FF						
							4						
15													
							RQD		C-5		BASALT, dark grey, medium grained, slightly weathered, moderately weak rock, HCl reaction not tested. Discontinuities are closely spaced and in poor condition, Percent Recovered 68.0%		
							0						
							FF						
							3						
5													
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK). GPJ SOIL.GDT 4/21/04 9:29:14 A4



LOG OF TEST BORING

Start Card R-65779

Job No. OL-3502 SR 270

Elevation 2458.1 ft (749.2 m)

HOLE No. H-17-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 1		C-6		BASALT, dark grey, medium grained, completely weathered, moderately weak rock, HCl reaction not tested. Discontinuities are very widely spaced and in very poor condition, Percent Recovered 1.0%		
25							RQD 34 FF 2		C-7		BASALT, dark grey, fine grained, slightly weathered, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in fair condition, Percent Recovered 60.0%		
30							RQD 80 FF 1		C-8		BASALT, dark grey, fine grained, fresh, strong rock, HCl reaction not tested. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
35													
11													
12											End of test hole boring at 36 ft below ground elevation.		
40											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
13											Pumped hole to 10.8 Recharge to 9.3 in a matter of minutes.		
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-65784

Job No. OL-3502 SR 270

Elevation 2476.8 ft (754.9 m)

HOLE No. H-18-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Site Address _____

Inspector Dan Reed

Start January 29, 2004 Completion January 29, 2004 Well ID# AHP474 Equipment CME 850 w/ autohammer

Station 196+50 Offset _____ Casing HW-4.5/HQ-3.5 Method Wet Rotary

Northing 855254.36 Easting 2818302.5 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the NW 1/4 Section 2 Range 45 EWM Township 14

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
1												
5												
2							3 5 5 (10)	D-2	GS MC AL	CL, MC=24%, PI=12 Lean CLAY with sand, stiff, light brown, moist, Disrupted, no HCl reaction, Trace of organics, roots.		
10							7 3 4 (7)	D-3		CLAY, medium stiff, light gray, moist, Homogeneous, no HCl reaction		
15							13 25 50 (75)	D-4	GS MC AL	SM, MC=22%, PI=6 Silty SAND with gravel, very hard, gray, moist, Disrupted, no HCl reaction, Mixed soil types and soil colors.		
20							RQD 2.6 FF 6+	C-5		BASALT, Slightly Vesicular, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Contact with rock at 17.0., Percent Recovered 90.0%		

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK) GPJ SOIL GDT 4/21/04 9:42:30 A4



LOG OF TEST BORING

Start Card R-65784

Job No. OL-3502 SR 270

Elevation 2476.8 ft (754.9 m)

HOLE No. H-18-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 5+		C-6		BASALT, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 80.0%		
25							RQD 0 FF 6+		C-7		BASALT, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 96.0%		
30							RQD 52 FF 3.6		C-8		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
35							RQD 30 FF 20+		C-9		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
40							RQD 29 FF 18		C-10		BASALT, medium grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition. Percent Recovered 100.0%		
45													



LOG OF TEST BORING

Start Card R-65784

Job No. OL-3502

SR 270

Elevation 2476.8 ft (754.9 m)

HOLE No. H-18-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Joe Judd

Lic# 2454

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											End of test hole boring at 45 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed bore hole water level to 30.0 feet. Water table stabilized at 23.0 feet in one hour.		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65784

Job No. OL-3502 SR 270

Elevation 2480.5 ft (756.0 m)

HOLE No. H-19-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson Lic# 2532

Site Address _____

Inspector Cleo Andrews

Start February 3, 2004 Completion February 3, 2004 Well ID# AHP-475

Equipment CME 850 w/ autohammer

Station 201 + 00 Offset _____ Casing (HWT 4" 22.0')(HQ 3" x 59.0') Method Wet Rotary

Northing 855201.87 Easting 2818749.76 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the NW 1/4 Section 2 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							2		D-1	GS MC AL HYD	CL, MC=22%, PI=20 Lean CLAY, medium stiff, olive gray, moist, Stratified, no HCl reaction		
5							2 2 4 (6)						
2									SH-2		Sandy SILT with gravel, loose, brown, moist, Homogeneous, no HCl reaction		
10							2 2 4 (6)		D-3		Sandy SILT with gravel, loose, brown, moist, Homogeneous, no HCl reaction		
4							3 5 5 (10)		D-4	GS MC AL HYD	CL, MC=27%, PI=18 Lean CLAY, stiff, olive gray, moist, Homogeneous, no HCl reaction, traces of brown and black stains		
15													
5													
20							5 10 44 (54)		D-5		Silty SAND with 3" layer of gravel with silty sand, very dense, olive gray, moist, Stratified, no HCl reaction		
6													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04 9:48:22 A4



LOG OF TEST BORING

Start Card R 65784

Job No. OL-3502

SR 270

Elevation 2480.5 ft (756.0 m)

HOLE No. H-19-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							RQD 0 FF 26		C-6		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are moderately spaced and in poor condition, highly fractured, Percent Recovered 100.0%		
7													
25							RQD 0 FF 26		C-7		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, highly fractured, Percent Recovered 100.0%		
8													
30							RQD 0 FF 26		C-8		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, highly fractured, Percent Recovered 100.0%		
9													
10													
35							RQD 0 FF 23		C-9		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, highly fractured, Percent Recovered 100.0%		
11													
40							RQD 0 FF 23		C-10		BASALT, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, moderately fractured, Percent Recovered 100.0%		
12													
13													
45							RQD 0		C-11		BASALT, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are very closely		



LOG OF TEST BORING

Start Card R 65784

Job No. OL-3502

SR 270

Elevation 2480.5 ft (756.0 m)

HOLE No. H-19-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							FF 11				spaced and in fair condition, moderately fractured, Percent Recovered 100.0%		
15							RQD 0		C-12		BASALT, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, moderately fractured. Percent Recovered 100.0%		
50							FF 9						
16													
55											End of test hole boring at 54 ft below ground elevation.		
17											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
18											Note : Bailed hole water table stabilized at 34.0', installed piezo well bailed piezo water table stabilized at 28.6' after 15 minutes delay. Next day reading 28.6'		
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.4 ft (760.0 m)

HOLE No. H-20-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson Lic# 2532

Site Address _____

Inspector Cleo Andrews

Start February 4, 2004 Completion February 4, 2004 Well ID# AHP-487

Equipment CME 850 w/ autohammer

Station 205 + 00 Offset 11.5' LT. of main Casing (HWT 4" x 28.0')(HQ 3" x 54.0') Method Wet Rotary

Northing 855123.96 Easting 2819148.54 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of the NW 1/4 Section 2 Range 45 EWM Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							2 2 4 (6)		D-1		Clayey SILT, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5													
2													
10							1 2 4 (6)		D-3	GS MC AL CU	(A)ML, MC=23%, PI=12 Sandy SILT, loose, brown, moist, Homogeneous, no HCl reaction (B)CL, MC=28%, PI=14 Lean CLAY with sand (C)CL, MC=25%, PI=13 Lean CLAY with sand CL, MC=26%, PI=14 Lean CLAY, medium stiff, brown, moist, Homogeneous, no HCl reaction		
4							2 2 3 (5)		D-4		Clayey SILT, loose, brown, moist, Homogeneous, no HCl reaction		
15													
5													
20									SH-5		Clayey SILT with gravel, medium dense, olive gray, moist, Homogeneous, no HCl reaction		



LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.4 ft (760.0 m)

HOLE No. H-20-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10 20 30 40							
				3 4 7 (11)		D-6		CLAY with gravel, medium dense, olive gray, moist, Homogeneous, no HCl reaction, traces of reddish brown and black stains.		
7				5 8 8 (18)		D-7	GS MC AL	SC, MC=23%, PI=12 Clayey SAND with gravel, very stiff, brown, moist, Homogeneous, no HCl reaction		
25										
8								Weathered BASALT		
				>>		D-8		100/6 (100/6")		
9										
30						C-9		BASALT with silty sand and iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, slightly vesicular, Percent Recovered 100.0%		
10						C-10		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
35										
11										
						C-11		BASALT with iron mineralization, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
40										
12										
						C-12		BASALT with iron mineralization, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities		
45										



LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.4 ft (760.0 m)

HOLE No. H-20-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							FF 5				are closely spaced and in fair condition, Percent Recovered 100.0%		
15													
50											End of test hole boring at 49 ft below ground elevation.		
16											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
55											Bailed hole water table stabilizez at 48.0' after 15 minute delay, installed piezo well at 48.0', bailed piezo water table stabilized at 38.6' after 15 minute delay. Next day reading 38.6', 2/5/04.		
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.1 ft (759.9 m)

HOLE No. H-21-04

Sheet 1 of 4

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Site Address _____

Inspector Cleo Andrews

Start February 5, 2004

Completion February 5, 2004

Well ID# AHP-488

Equipment CME 850 w/ autohammer

Station 210 + 00

Offset main

Casing HQ 3" x 75.0'

Method Wet Rotary

Northing 855135.73

Easting 2819649.48

Latitude _____

Longitude _____

County Whitman

Subsection SE 1/4 of the NW 1/4

Section 2

Range 45 EWM

Township 14 N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 16 FF 4		C-1		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (moderately fractured), Percent Recovered 100.0%		
5							RQD 0 FF 10		C-2		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (Moderately fractured), Percent Recovered 100.0%		
10							RQD 21 FF 6		C-3		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (slightly vesicular, moderately weathered), Percent Recovered 100.0%		
15							RQD 0 FF 21		C-4		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (highly vesicular, moderately fractured), Percent Recovered 100.0%		
20													



LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.1 ft (759.9 m)

HOLE No. H-21-04

Sheet 2 of 4

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 6		C-5		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (highly vesicular, moderately fractured), Percent Recovered 100.0%		
25							RQD 40 FF 5		C-6		BASALT with iron mineralization, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (highly vesicular, moderately fractured), Percent Recovered 100.0%	03/11/04	
8												02/05/2004	
9							RQD 16 FF 10		C-7		BASALT with iron mineralization, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, (moderately vesicular, moderately fractured), Percent Recovered 100.0%		
30													
10							RQD 23 FF 9		C-8		BASALT with iron mineralization, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, (moderately vesicular, moderately fractured), Percent Recovered 100.0%		
35													
11													
12							RQD 60 FF 3		C-9		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.1 ft (759.9 m)

HOLE No. H-21-04

Sheet 3 of 4

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 71 FF 2		C-10		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
15													
50							RQD 86 FF 3		C-11		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
16													
55							RQD 95 FF 2		C-12		BASALT, fine grained, slightly weathered, very strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
17													
18													
60							RQD 100 FF 0		C-13		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are very closely spaced and in excellent condition, Percent Recovered 100.0%		
19													
65							RQD 100 FF 0		C-14		BASALT, fine grained, fresh, very strong rock, no HCl reaction. Discontinuities are very closely spaced and in excellent condition, Percent Recovered 100.0%		
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65785

Job No. OL-3502

SR 270

Elevation 2493.1 ft (759.9 m)

HOLE No. H-21-04

Sheet 4 of 4

Project Pullman to Moscow Line work.

Driller Vince Johnson

Lic# 2532

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
22											End of test hole boring at 70 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed hole water table stabilized at 29.3, installed piezo at 50.0', bailed piezo well water stabilized at 27.7' after 15 minutes delay		
75													
23													
24													
80													
25													
85													
26													
27													
90													
28													
95													

Start Card R-65790

Job No. OL-3502 SR 270 Elevation 2494.5 ft (760.3 m)

HOLE No. H-22-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo Lic# 2615

Site Address _____

Inspector Dave Nelson

Start January 18, 2004 Completion January 8, 2004 Well ID# AHP-471 Equipment CME 45 w/ autohammer

Station SS 14+45 Offset 8' Lt. Casing 4.5 x 7.0 & 3.5 27.0 Method Wet Rotary

Northing 855544.84 Easting 2822341.69 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of NW 1/4 Section 1 Range 45 EWM Township 14

[illegible]



LOG OF TEST BORING

Start Card R-65790

Job No. OL-3502

SR 270

Elevation 2494.5 ft (760.3 m)

HOLE No. H-22-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Sean Verlo

Lic# 2615

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7													
25													
8													
9													
30													
10													
35													
11													
12													
40													
13													
45													

End of test hole boring at 27 ft below ground elevation.

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

NOTE:

Pumped to 12.0, Recharged to 7.0, Pipe in hole 3.5 x 27.0



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65790

Job No. OL-3502

SR 270

Elevation 2491.6 ft (759.4 m)

HOLE No. H-23-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 19, 2004 Completion January 20, 2004 Well ID# AHP 461

Equipment CME 850 w/ autohammer

Station _____ Offset _____ Casing HQ 3.5

Method Wet Rotary

Northing 855783.61 Easting 2823080.9 Latitude _____ Longitude _____

County Whitman Subsection SW/NW Section 1 Range 45 EWM Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							4		D-1		SILT with sand, & fine gravel, medium dense, grayish brown, moist, Stratified, no HCl reaction		
5							5						
							7						
							(12)						
2									C-2		Silty GRAVEL with coarse sand and wood debris, angular, medium dense, grayish brown, moist, Stratified, no HCl reaction		
10													
3							2		D-3	GS MC AL	CL, MC=26%, PI=13 Lean CLAY with sand, medium dense, brown, moist, Homogeneous, no HCl reaction		
4							5						
							7						
							(12)						
15									U-4		SILT, medium dense, brownish gray, moist, Homogeneous, no HCl reaction		
									A				
									B				
									C				
									D				
5							2		D-5		SILT with some sand and trace gravel, loose, gray, moist, Stratified, no HCl reaction, Some organics.		
							2						
							3						
							(5)						
6									S-6		SILT, loose, gray, moist, Homogeneous, no HCl reaction		
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04,10:51:20 A4



LOG OF TEST BORING

Start Card R 65790

Job No. OL-3502

SR 270

Elevation 2491.6 ft (759.4 m)

HOLE No. H-23-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10 20 30 40							
7				2 7 21 (28)	D-7			SILT with trace sand and organics, dense, gray, moist, Stratified, no HCl reaction, Note bottom .5ft silty coarse sand. Silt on top soft.		
25				>> 11 16 50/3" (66/9") RQD 0 FF 20	D-8			Silty SAND with gravel, very dense, grayish brown, moist, Stratified, no HCl reaction		
8					C-9			BASALT, fine grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Iron stained throughout. Percent Recovered 50.0%		
9										
30										
								End of test hole boring at 30.5 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
								Bailed hole before install, water reading 15.5ft		
10										
35										
11										
12										
40										
13										
45										



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23894

Job No. OL-3502 SR 270 Elevation 2499.8 ft (761.9 m)

HOLE No. H-24-04

Sheet 1 of 1

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 14, 2004 Completion January 14, 2004 Well ID# NA Equipment CME 850 w/ autohammer

Station 249+60 Offset _____ Casing HQ 3.5" Method Wet Rotary

Northing 856308.04 Easting 2823460.44 Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45 EWM Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 9 FF 20		C-1		BASALT, moderately vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 80.0%		
5							RQD 78 FF 4.4		C-2		BASALT, moderately vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
10							RQD 80 FF 2.0		C-3		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
15											End of test hole boring at 15 ft below ground elevation.		
20											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65791

Job No. OL-3502 SR 270 Elevation 2532.6 ft (771.9 m)

HOLE No. H-25-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 14, 2004 Completion January 15, 2004 Well ID# AHP 463 Equipment CME 850 w/ autohammer

Station 252+25 Offset 20Lt Casing HQ 3.5" Method Wet Rotary

Northing 856433.76 Easting 2823682.95 Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45E Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							2 2 2 (4)	D-1			SILT with trace sand and organics, very loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
10							50/3" (50/3")	D-2 C-3			BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
15							RQD 92 FF 1	C-4					
20							RQD 60 FF 20	C-5			BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		



LOG OF TEST BORING

Start Card R 65791

Job No. OL-3502

SR 270

Elevation 2532.6 ft (771.9 m)

HOLE No. H-25-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 85 FF 3		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25							RQD 100 FF .8		C-7		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
8													
30							RQD 100 FF .8		C-8		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
9													
10													
35							RQD 89 FF 1.4		D-9		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
11													
40							RQD 92 FF 1		C-10		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
12													
13													
45													

03/11/04



LOG OF TEST BORING

Start Card R 65791

Job No. OL-3502

SR 270

Elevation 2532.6 ft (771.9 m)

HOLE No. H-25-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14							RQD 98 FF .8		C-11		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
15													
50							RQD 50 FF 20		C-12		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 100.0%		
16													
55													
17							RQD 11 FF 20		C-13		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Note iron staining and some silty infilling from 52.5 ft. to 60.5 ft., Percent Recovered 100.0%		
18													
60													
19											End of test hole boring at 60.5 ft below ground elevation.		
20											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502 SR 270 Elevation 2515.0 ft (766.6 m)

HOLE No. H-26-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 15, 2004 Completion January 16, 2004 Well ID# NA Equipment CME 850 w/ autohammer

Station 254+60 Offset _____ Casing HQ 3.5" Method Wet Rotary

Northing _____ Easting _____ Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45 EWM Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 20 FF 20		C-1		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 91.0%		
5													
2							RQD 70 FF 3.5		C-2		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
10													
3							RQD 82 FF 4.2		C-3		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
4													
15													
5							RQD 85 FF 4.8		C-4		BASALT, moderately vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
6													
20													



LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502

SR 270

Elevation 2515.0 ft (766.6 m)

HOLE No. H-26-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 94 FF .4		C-5		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25													
8							RQD 65 FF 2.4		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
9													
30													
10											End of test hole boring at 31 ft below ground elevation.		
35											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65792

Job No. OL-3502

SR 270

Elevation 2526.5 ft (770.1 m)

HOLE No. H-27-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 19, 2004 Completion January 19, 2004 Well ID# AHP 462

Equipment CME 850 w/ autohammer

Station 257+00 Offset _____ Casing HQ 3.5"

Method Wet Rotary

Northing 856648.36 Easting 2824127.13 Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45EWM Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							50/6 (50/6")		D-1		SILT with some broken rock, very dense, brown, moist, Homogeneous, no HCl reaction		
5							RQD 30		C-2		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
2							FF 20		C-3		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
10							RQD 50		C-4		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Some silty infill., Percent Recovered 100.0%		
4							FF 4.3						
15							RQD 60		C-5		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Note iron staining in fractures., Percent Recovered 100.0%		
5							FF 1						
20													



LOG OF TEST BORING

Start Card R 65792

Job No. OL-3502

SR 270

Elevation 2526.5 ft (770.1 m)

HOLE No. H-27-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 73 FF 1		C-6		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0% 04/06/04		
25							RQD 100 FF .8		C-7		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
30							RQD 100 FF 1		C-8		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
35											End of test hole boring at 35 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note bailed hole before install, no recharge.		
40													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502

SR 270

Elevation 2521.9 ft (768.7 m)

HOLE No. H-28-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 18, 2004 Completion January 18, 2004 Well ID# NA Equipment CME 850 w/ autohammer

Station 259+80 Offset _____ Casing HQ 3.5" Method Wet Rotary

Northing 856758.99 Easting 2824355.06 Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45EWM Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							>>						
							4		D-1		SILT with organics and broken rock, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
							8						
							50/4"						
							(58/10")						
2							RQD		C-2		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
							20						
							FF						
							2						
10													
							RQD		C-3		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
							20						
							FF						
							2.3						
4													
15													
							RQD		C-4		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
							100						
							FF						
							.8						
5													
6													
20													



LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502

SR 270

Elevation 2521.9 ft (768.7 m)

HOLE No. H-28-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 100 FF 1		C-5		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25							RQD 100 FF .5		C-6				
8							RQD 100 FF .5		C-7				
30													
9													
35													
10													
11													
12											End of test hole boring at 36 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40													
13													
45													

LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502 SR 270 Elevation 2522.2 ft (768.8 m)

HOLE No. H-29-04Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 17, 2004 Completion January 18, 2004 Well ID# Na Equipment CME 850 w/ autohammer

Station 261+80 Offset Casing HQ 3.5" Method Wet Rotary

Northing 856856.13 Easting 2824526.12 Latitude _____ Longitude _____

County Whitman Subsection NE/NW Section 1 Range 45 EWM Township 14N

[illegible]



LOG OF TEST BORING

Start Card S 23895

Job No. OL-3502

SR 270

Elevation 2522.2 ft (768.8 m)

HOLE No. H-29-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 20 FF 1.3		C-5		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Note iron staining., Percent Recovered 100.0%		
25							RQD 10 FF 1		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 8 FF 1		C-7		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
10													
35											End of test hole boring at 33 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed hole, had no recharge.		
11													
40													
12													
45													
13													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23896

Job No. OL-3502

SR 270

Elevation 2517.6 ft (767.4 m)

HOLE No. H-30-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 16, 2004 Completion January 16, 2004 Well ID# NA

Equipment CME 850 w/ autohammer

Station 264+00 Offset _____ Casing HQ 3.5

Method Wet Rotary

Northing 856952.14

Easting 2824699.86

Latitude _____ Longitude _____

County Whitman

Subsection NW/NE

Section 1

Range 45 EWM

Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
							RQD 0 FF 20		C-1		Note: 1.5 ft of silty overburden with broken rock throughout.		
1											BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very widely spaced and in fair condition, Percent Recovered 70.0%		
5							RQD 50 FF 20		C-2		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very widely spaced and in fair condition, Percent Recovered 100.0%		
2													
10							RQD 10 FF 20		C-3		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 100.0%		
4													
15							RQD 100 FF 1.5		C-4		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
5													
6													
20													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23896

Job No. OL-3502

SR 270


Elevation 2517.6 ft (767.4 m)

HOLE No. H-30-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 100 FF 1		C-5		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25													
8											End of test hole boring at 25 ft below ground elevation.		
9											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30											Note: Bailed hole, waited 30 minutes, no recharge.		
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23896

Job No. OL-3502

SR 270

Elevation 2512.2 ft (765.7 m)

HOLE No. H-31-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start February 2, 2004

Completion February 3, 2004

Well ID# NA

Equipment CME 850 w/ autohammer

Station 276+35

Offset _____

Casing HQ 3.5"

Method Wet Rotary

Northing 857428.28

Easting 2825854.21

Latitude _____ Longitude _____

County Whitman

Subsection NW/NE

Section 1

Range 45 EWM

Township 14N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							1	D-1			Lean CLAY with trace sand and organics, soft, brown, moist, Homogeneous, no HCl reaction		
5							2 2 (4)						
2													
10							1 1 2 (3)	D-2		GS MC AL HYD	CL, MC=30%, PI=4 Lean CLAY, soft, brown, moist, Homogeneous, no HCl reaction		
								S-3			Lean Clay, soft, brown, moist, Homogeneous, no HCl reaction		
4							7 50/2" (50/2")	D-4			Silty GRAVEL, angular, very dense, grayish brown, moist, Homogeneous, no HCl reaction		
								C-5					
15							RQD 0 FF 20	C-6			BASALT, fine grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
5													
6													
20													



LOG OF TEST BORING

Start Card S 23896

Job No. OL-3502

SR 270

Elevation 2512.2 ft (765.7 m)

HOLE No. H-31-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 20		C-7		BASALT, fine grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 100.0%		
25													
8											End of test hole boring at 25 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed hole, no recharge		
9													
30													
10													
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65794

Job No. OL-3502

SR 270

Elevation 2531.8 ft (771.7 m)

HOLE No. H-32-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start February 1, 2004 Completion February 1, 2004 Well ID# AHP 493 Equipment CME 850 w/ autohammer

Station 281+95 Offset _____ Casing HQ 3.5" Method Wet Rotary

Northing 857630.15 Easting 2826421.72 Latitude _____ Longitude _____

County Whitman Subsection SE/SE Section 36 Range 45 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							4		D-1		SILT with decomposed rock, very dense, dark brown, moist, Stratified, no HCl reaction		
5							50/2" (50/2")						
							RQD 0		C-2		BASALT, slightly vesicular, fine grained, highly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 66.0%		
2							FF 20						
10							RQD 23		C-3		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 100.0%		
							FF 20						
4													
15							RQD 76		C-4		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
							FF .8						
5													
20													
6													



LOG OF TEST BORING

Start Card R 65794

Job No. OL-3502

SR 270

Elevation 2531.8 ft (771.7 m)

HOLE No. H-32-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 92 FF .2		C-5		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25							RQD 62 FF 1.2		C-6		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 95 FF .4		C-7		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
9													
10													
35													
11											End of test hole boring at 35 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed hole, no recharge.		
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65794

Job No. OL-3502

SR 270

Elevation 2530.9 ft (771.4 m)

HOLE No. H-33-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Hanning Lic# 2708

Site Address _____

Inspector Hanning

Start February 1, 2004 Completion February 1, 2004 Well ID# AHP 496

Equipment CME 850 w/ autohammer

Station 286+70 Offset _____ Casing HQ 3.5"

Method Wet Rotary

Northing 857751.12 Easting 2826796.4 Latitude _____ Longitude _____

County Whitman Subsection SE/SE Section 36 Range 45 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							RQD 0 FF 20		C-1		BASALT, slightly vesicular, fine grained, highly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 56.0%		
5							RQD 0 FF 20		C-2		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 92.0%		
10							RQD 68 FF 3.4		C-3		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%	03/11/04	
15							RQD 90 FF 1.2		C-4		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
20							RQD		C-5		BASALT, slightly vesicular, fine grained, fresh, strong		



LOG OF TEST BORING

Start Card R 65794

Job No. OL-3502

SR 270

Elevation 2530.9 ft (771.4 m)

HOLE No. H-33-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Hanning Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							90 FF 1.2				rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25							RQD 90 FF 1.2		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
8													
9													
30											End of test hole boring at 29.5 ft below ground elevation.		
10											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35											Bailed hole, no recharge		
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65795

Job No. OL-3502

SR 270

Elevation 2527.8 ft (770.5 m)

HOLE No. H-34-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 31, 2004 Completion February 1, 2004 Well ID# AHP 494

Equipment CME 850 w/ autohammer

Station 291+70 Offset _____ Casing HQ 3.5"

Method Wet Rotary

Northing 858043.41 Easting 2827375.88 Latitude _____ Longitude _____

County Whitman Subsection SW/SW Section 31 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							2		D-1		SILT with organics and trace sand, medium dense, brown, moist, Homogeneous, no HCl reaction		
5							7						
							8						
							(15)						
2											BASALT, moderately vesicular, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 100.0%		
							RQD		C-2				
							11						
							FF						
							20						
10											BASALT, slightly vesicular, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Note 13.2 to 13.4 silty sand infilling, sand subrounded & iron stained., Percent Recovered 100.0%		
							RQD		C-3				
							0						
							FF						
							20						
4											BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
							RQD		C-4				
15							76						
							FF						
							2.6						
5													
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK) GPJ SOIL GDT 4/21/04 11:56:37 A4



LOG OF TEST BORING

Start Card R 65795

Job No. OL-3502

SR 270

Elevation 2527.8 ft (770.5 m)

HOLE No. H-34-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 98 FF .2		C-5		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
25							RQD 65 FF 2.4		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 50 FF 4.2		C-7		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		
9													
10													
35													
11											End of test hole boring at 35 ft below ground elevation.		
12											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40											Note: Bailed hole, then pulled casing back to 15 ft. Placed bottom seal to 20 ft water reading taken 02-01-04		
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65795

Job No. OL-3502

SR 270

Elevation 2524.3 ft (769.4 m)

HOLE No. H-35-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 30, 2004 Completion January 30, 2004 Well ID# AHP 495

Equipment CME 850 w/ autohammer

Station 296+85 Offset _____ Casing 4" x 30.5

Method Wet Rotary

Northing 858250.23 Easting 2827665.09 Latitude _____ Longitude _____

County Whitman Subsection SW 1/4 of SW 1/4 Section 31 Range 46 e. Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
											SILT		
1							RQD 0 FF 20		C-1		BASALT, slightly vesicular, brownish gray, fine grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition, Note: silty infilling, iron staining. Percent Recovered 80.0%		
5							RQD 0 FF 20		C-2		BASALT, moderately vesicular, gray, fine grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 100.0%		
10							RQD 0 FF 20		C-3		BASALT, moderately vesicular, brownish gray, fine grained, highly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition, silty infilling, iron staining., Percent Recovered 100.0%		
15							RQD 10 FF 20		C-4		BASALT, slightly vesicular, grayish brown, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
20													



LOG OF TEST BORING

Start Card R 65795

Job No. OL-3502

SR 270

Elevation 2524.3 ft (769.4 m)

HOLE No. H-35-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 5 FF 20		C-5		BASALT, slightly vesicular, gray, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 100.0%		
25							RQD 0 FF 20		C-6		BASALT, slightly vesicular, gray, fine grained, fresh, strong rock. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
8													
30													
9													
10											End of test hole boring at 30.5 ft below ground elevation.		
35											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
11											Note: Bail hole, no recharge. Install piezo		
40													
12													
45													
13													

LOG OF TEST BORING

Start Card S 23898

Job No. OL-3502 SR 270

Elevation 2509.8 ft (765.0 m)

HOLE No. H-36-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 30, 2004 Completion January 30, 2004 Well ID# NA Equipment CME 850 w/ autohammer

Station 310+30 Offset Casing HQ 3.5" Method Wet Rotary

Northing 859293.1 Easting 2829059.31 Latitude _____ Longitude _____

County Whitman Subsection SW/SW Section 31 Range 46EWM Township 15N

[illegible]



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23898

Job No. OL-3502

SR 270

Elevation 2509.8 ft (765.0 m)

HOLE No. H-36-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
7										<p>End of test hole boring at 21 ft below ground elevation.</p> <p>This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.</p> <p>Note: Bailed hole, no recharge.</p>		
25												
8												
9												
30												
10												
35												
11												
12												
40												
13												
45												



LOG OF TEST BORING

Start Card R 65796

Job No. OL-3502 SR 270

Elevation 2515.6 (766.8 m)

HOLE No. H-37-04

Sheet 1 of 1

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 29, 2004 Completion January 29, 2004 Well ID# AHP 479 Equipment CME 850 w/ autohammer

Station 319+50 Offset _____ Casing HWT 5.0" Method Wet Rotary

Northing 859636.27 Easting 2829583.56 Latitude _____ Longitude _____

County Whitman Subsection NE/SW Section 31 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							3 4 4 (8)		D-1		SILT with organics, loose, dark grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
2													
10							RQD 37 FF 3.6		C-2		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Some iron staining., Percent Recovered 100.0%		
3							RQD 78 FF 1.8		C-3		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
4													
15													
5											End of test hole boring at 15 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail test: No recharge.		
6													
20													



LOG OF TEST BORING

Start Card R 65796

Job No. OL-3502

SR 270

Elevation 2511.9 ft (765.6 m)

HOLE No. H-38-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 29, 2004 Completion January 29, 2004 Well ID# AHP 478 Equipment CME 850 w/ autohammer

Station 319+80 Offset _____ Casing HWT 5.0" Method Wet Rotary

Northing 859482.18 Easting 2829625.32 Latitude _____ Longitude _____

County Whitman Subsection NE/SW Section 31 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							2 2 4 (6)	D-2		GS MC AL	ML, M.C.=42%, LL=40 SILT with sand, soft, grayish brown, moist, Homogeneous, no HCl reaction		
10								S-3		GS MC AL CN	ML, MC=29%, PI=9 SILT, loose, greenish gray, moist, Homogeneous, no HCl reaction		
4							2 3 7 (10)	D-4		GS MC AL	ML, MC=24%, LL=28 SILT with sand and organics, loose, greenish gray, moist, Homogeneous, no HCl reaction		
15							2 3 12 (15)	D-5			Sandy SILT with trace gravel and organics, medium dense, greenish gray, wet, Stratified, no HCl reaction, Note bottom 0.5 ft water bearing. Length Recovered 1.2 ft, Length Retained 1.2 ft		
5							RQD 55 FF 5	C-6			BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Note drilling behavior and fluid return indicates significant sand, 16.0 ft. to 18.0 ft, Percent Recovered 60.0%		
20													



LOG OF TEST BORING

Start Card R 65796

Job No. OL-3502

SR 270

Elevation 2511.9 ft (765.6 m)

HOLE No. H-38-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 95 FF .8		C-7		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
25													
8													
9											End of test hole boring at 26 ft below ground elevation.		
30											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
10											Note: No bail test		
35													
11													
12													
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65797

Job No. OL-3502 SR 270

Elevation 2516.1 ft (766.9 m)

HOLE No. H-39-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 28, 2004 Completion January 28, 2004 Well ID# AHP 477 Equipment CME 850 w/ autohammer

Station 325+00 Offset _____ Casing HWT 5.0" Method Wet Rotary

Northing 859619.56 Easting 2830113.01 Latitude _____ Longitude _____

County Whitman Subsection NW/SE Section 31 Range 46EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							1 2 4 (6)	D-1			SILT with trace sand and organics, loose, brownish gray, moist, Homogeneous, no HCl reaction		
2													
10							2 3 5 (8)	D-2		GS MC AL HYD	CL, MC=26%, PI=11 Lean CLAY, medium stiff, greenish gray, moist, Homogeneous, no HCl reaction		
4													
15							1 2 5 (7)	D-3			SILT with sand and some gravel, loose, olive brown, wet, Stratified, no HCl reaction		
5							RQD 0 FF 20	C-4			BASALT, fine grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition, Note iron stained, sandy infilling, Percent Recovered 75.0%		
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04 12:05:40 P4



LOG OF TEST BORING

Start Card R 65797

Job No. OL-3502 SR 270

Elevation 2516.1 ft (766.9 m)

HOLE No. H-39-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 70 FF 2		C-5		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 100.0%		
25							RQD 92 FF .8		C-6		BASALT, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are closely spaced and in excellent condition, Percent Recovered 100.0%		
8													
9													
30													
											End of test hole boring at 30 ft below ground elevation.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
											Bail test: Recharge stabilized at 12.4 ft after 20 minutes		
10													
35													
11													
12													
40													
13													
45													



LOG OF TEST BORING

Start Card R 65797

Job No. OL-3502

SR 270

Elevation 2592.0 ft (790.0 m)

HOLE No. H-40-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 27, 2004

Completion January 28, 2004

Well ID# AHP 476

Equipment CME 850 w/ autohammer

Station 332+85

Offset _____

Casing HWT

Method Wet Rotary

Northing 859835.25

Easting 2830849.23

Latitude _____

Longitude _____

County Whitman

Subsection NE/SW

Section 31

Range 46EWM

Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1							2		D-1		Lean CLAY with trace organics and ash, medium dense, brown, moist, Homogeneous, no HCl reaction		
5							6						
							7						
							(13)						
2													
10							4		D-2	GS	CL, MC=22%, PI=13		
							6			MC	Lean CLAY, stiff, brown, moist, Homogeneous, no HCl reaction		
							7			AL			
							(13)			HYD			
3													
4							4		D-3		Lean CLAY with trace sand, medium dense, brown, moist, Homogeneous, no HCl reaction		
							7						
							11						
							(18)						
15													
5													
6							3		D-4	GS	CL, MC=24%, PI=17		
							5			MC	Lean CLAY, stiff, brown, moist, Homogeneous, no HCl reaction		
							7			AL			
							(12)			HYD			
20													



LOG OF TEST BORING

Start Card R 65797

Job No. OL-3502

SR 270

Elevation 2592.0 ft (790.0 m)

HOLE No. H-40-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7													
25							5 6 8 (14)		S-5 D-6		SILT, medium dense, brown, moist, Homogeneous, no HCl reaction SILT, medium dense, brown, moist, Homogeneous, no HCl reaction		
8													
30							2 2 4 (6)		D-7		SILT, loose, brown, moist, Homogeneous, no HCl reaction		
9									S-8		SILT, loose, brown, moist, Homogeneous, no HCl reaction		
10							3 4 5 (9)		D-9		SILT, loose, brown, moist, Homogeneous, no HCl reaction		
35									S-10		SILT, loose, brown, moist, Homogeneous, no HCl reaction		
11							3 4 7 (11)		D-11		SILT, medium dense, brown, moist, Homogeneous, no HCl reaction		
12							4 5 8 (13)		D-12		SILT with sand and decomposed rock, medium dense, brownish gray, moist, Stratified, no HCl reaction		
40													
13													
45							>> 70/6 (70/6")		D-13		Silty SAND with decomposed rock, very dense, dark gray, moist, Homogeneous, no HCl reaction		



LOG OF TEST BORING

Start Card R 65797

Job No. OL-3502

SR 270

Elevation 2592.0 ft (790.0 m)

HOLE No. H-40-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											01/28/2004		
							50/2 (50/2")		D-14		No Recovery		
											End of test hole boring at 47.1 ft below ground elevation.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
											BAIL TEST: Bailed hole, water reading after 15 min 42.5ft below ground elevation Bailed again, water reading before install 45.5ft below ground elevation		
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23952

Job No. OL-3502

SR 270

Elevation 2548.4 ft (776.7 m)

HOLE No. H-41-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 27, 2004 Completion January 27, 2004 Well ID# NA Equipment CME 850 w/ autohammer

Station 337+80 Offset _____ Casing HQ 3.5" Method Wet Rotary

Northing 859870.3 Easting 2831373.12 Latitude _____ Longitude _____

County Whitman Subsection NE/SE Section 31 Range 46EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							3 6 8 (14)	D-1			SILT with organics, medium dense, brown, moist, Homogeneous, no HCl reaction		
2													
10							19 50/ 5" (50/5")	D-2		GS MC AL	SM, MC=34%, LL=48 Silty SAND with gravel, very dense, dark brown, moist, Blocky, no HCl reaction		
3													
4							RQD 36 FF 2.9	C-3			BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Note some yellowish/orangish brown silty infilling, Percent Recovered 100.0%		
15													
5							RQD 0 FF 12	C-4			BASALT, moderately vesicular, fine grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Note iron staining and silty yellowish infilling., Percent Recovered 100.0%		
6													
20													

SOIL OL-3502 PULLMAN TO MOSCOW (LINE WORK).GPJ SOIL.GDT 4/21/04 12:11:24 P4



LOG OF TEST BORING

Start Card S 23952

Job No. OL-3502

SR 270

Elevation 2548.4 ft (776.7 m)

HOLE No. H-41-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 15 FF 10		C-5		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Note iron staining and silty yellowish/orangish gray infilling., Percent Recovered 100.0%		
25							RQD 25 FF 6		C-6		BASALT, slightly vesicular, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Note silty infilling and iron staining, Percent Recovered 100.0%		
30													
10											End of test hole boring at 30.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail test: Bailed then pulled casing, water reading 30.00 ft. No recharge after 30 minutes.		
35													
11													
12													
40													
13													
45													



LOG OF TEST BORING

Start Card R 65799

Job No. OL-3502

SR 270

Elevation 2516.9 ft (767.2 m)

HOLE No. H-42-03

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller J. Fetterly Lic# 2708

Site Address _____

Inspector Ybarra

Start December 17, 2003 Completion December 17, 2003 Well ID# AHP 472 Equipment CME 850 w/ autohammer

Station 7+90 Offset C/L Casing 4" x 45.5 Method Wet Rotary

Northing 859402.48 Easting 2831418.68 Latitude _____ Longitude _____

County Whitman Subsection SE 1/4 of SE 1/4 Section 31 Range 46 e. Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
											surface is TOPSOIL, wetland.		
1									S-1		Sandy SILT, loose, dark gray, moist, Homogeneous, no HCl reaction		
5							5 4 3 (9)		D-2		Sandy SILT, loose, dark gray, moist, Homogeneous, no HCl reaction	03/31/04	
2												12/17/2003	
10		x x x x							S-3	GS MC AL	ML, M.C. = 26%, PI = 8 Sandy SILT, medium stiff, bluish green, moist, Stratified, no HCl reaction, mottled, trace organics.		
4							1 3 5 (8)		D-4		Silty SAND with gravel, loose, dark olive gray, wet, Stratified, Disrupted, no HCl reaction, becomes gravelly at 12.5.		
15							50/6 (50/6")		D-5		Well graded GRAVEL, angular, very dense, dark brown, wet, Homogeneous, no HCl reaction, drill HW casing to 15.5'.		
5							RQD 40 FF 2		C-6		BASALT, vesicular, dark gray, medium grained, fresh, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 90.0%		
6													
20													



Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 90 FF 1		C-7		BASALT, slightly vesicular, dark gray, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
25							RQD 100 FF 0		C-8		BASALT, slightly vesicular, dark gray, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
8													
30							RQD 100 FF 0		C-9		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
9													
35							RQD 100 FF 0		C-10		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
10													
40							RQD 100 FF 0		C-11		BASALT, dark gray, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in good condition, Percent Recovered 100.0%		
11													
45													
12													
13													



LOG OF TEST BORING

Start Card R 65799

Job No. OL-3502

SR 270

Elevation 2516.9 ft (767.2 m)

HOLE No. H-42-03

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller J. Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14													
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													

End of test hole boring at 45.5 ft below ground elevation.

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.



LOG OF TEST BORING

Start Card R 65798

Job No. OL-3502

SR 270

Elevation 2519.6 ft (768.0 m)

HOLE No. H-43-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Hanning Lic# 2196

Site Address _____

Inspector Hanning

Start January 21, 2004 Completion January 21, 2004 Well ID# AHP 480 Equipment CME 850 w/ autohammer

Station 347+50 Offset CL Casing HQ 3.5" Method Wet Rotary

Northing 859831.53 Easting 2831857.32 Latitude _____ Longitude _____

County Whitman Subsection NE/SE Section 31 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							2 3 3 (6)	D-2		GS MC AL	ML, M.C. = 23%, PI = 4 at 5.2' SILT with sand CL-ML, M.C. = 23%, PI = 6 at 5.6' Silty CLAY with sand, loose, brown, moist, Homogeneous, no HCl reaction CL, MC=24%, PI=9 Lean CLAY with sand, medium stiff, dark brown, moist, Homogeneous, no HCl reaction	04/06/04	
10							2 3 4 (7)	D-3		GS MC AL	CL, MC=27%, PI=9 Lean CLAY with sand, medium stiff, greenish gray, moist, Homogeneous, no HCl reaction	01/21/2004	
15							6 8 28 (36)	D-4		GS MC	SM, MC=15% Silty SAND with gravel, dense, light brown, wet, Stratified, no HCl reaction		
20							RQD 0 FF 20	C-5			BASALT, medium grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition, Percent Recovered 40.0%		



Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 0 FF 20		C-6		BASALT, medium grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition, Percent Recovered 100.0%		
25							RQD 0 FF 20		C-7		BASALT, fine grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 100.0%		
30							RQD 0 FF 20		C-8		BASALT, fine grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 90.0%		
35													
11											End of test hole boring at 35.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bail and recharge, water reading 7.0ft		
12													
40													
13													
45													



LOG OF TEST BORING

Start Card R 65798

Job No. OL-3502

SR 270

Elevation 2518.1 ft (767.5 m)

HOLE No. H-44-03

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller James Fetterly Lic# 2708

Site Address _____

Inspector Dan Reed

Start December 22, 2003 Completion December 22, 2003 Well ID# AHP 482 Equipment CME 850 w/ autohammer

Station 374 + 00 Offset main Casing HW 4.5" and HQ 3.5" Method Wet Rotary

Northing 859707.87 Easting 2832244.21 Latitude _____ Longitude _____

County Whitman Subsection NE 1/4 of SE 1/4 Section 31 Range 46 e Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5													
2							1 2 1 (3)	U-1 A B C D E F2		GS MC AL	CL, M.C. = 32%, PI = 17 Lean CLAY with sand, very soft, dark gray, wet, Disrupted, no HCl reaction Lean CLAY with trace of organics, very soft, dark gray, wet, Disrupted, no HCl reaction		
10							1 1 1 (2)	U-3 A B D-4			ORGANIC SOIL with sand, very soft, dark brown, wet, Homogeneous, no HCl reaction, moisture tin retained ORGANIC SOIL with sand, roots, very soft, dark brown, wet, Homogeneous, no HCl reaction		
15							1 1 2 (3)	D-5			Well graded GRAVEL with sand, angular, very dense, dark brown, wet, Homogeneous, no HCl reaction, highly weathered basalt		
5							RQD 0 FF 20+	C-6			BASALT, highly vesicular, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, highly fractured rock, Percent Recovered 100.0%		
20													



Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 64 FF 20+		C-7		BASALT, highly vesicular, medium grained, moderately weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, highly fractured rock highly weathered zones 20.0 - 23.0', Percent Recovered 94.0%		
25							RQD 74 FF 20+		C-8		BASALT, moderately vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are moderately spaced and in fair condition, highly fractured rock weathered zones 28.0 - 30.0', Percent Recovered 100.0%		
30							RQD 54 FF 20+		C-9		BASALT, moderately vesicular, medium grained, highly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, highly fractured rock weathered zones within ash 30.0 - 33.0', Percent Recovered 94.0%		
35							RQD 96 FF 0.4		C-10		BASALT, slightly vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are widely spaced and in excellent condition, Percent Recovered 96.0%		
40											End of test hole boring at 40 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed water level to 10.8 ft, stabilized at 4.8 ft in 1 hour		
45													



LOG OF TEST BORING

Start Card R 65799

Job No. OL-3502 SR 270

Elevation 2540.8 (774.4 m)

HOLE No. H-45-03

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller James Fetterly Lic# 2708

Site Address _____

Inspector Dan Reed

Start December 20, 2003 Completion December 20, 2003 Well ID# AHP 481

Equipment CME 850 w/ autohammer

Station 20+00 Offset _____ Casing HW 4.5" and HQ 3.5"

Method Wet Rotary

Northing 859256.26

Easting 2832409.44

Latitude _____

Longitude _____

County Whitman Subsection SE 1/4 of SE 1/4

Section 31

Range 46 e

Township 15

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40						
							1 1 2 (3)	D-1		SILT trace of organics, very loose, dark brown, moist, Homogeneous, no HCl reaction		
1							RQD 0 FF 20+	C-2		BASALT, highly vesicular, medium grained, highly weathered, moderately weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, highly fractured rock, Percent Recovered 66.0%		
5							RQD 50 FF 20+	C-3		BASALT, highly vesicular, medium grained, moderately weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, highly fractured rock, Percent Recovered 100.0%		
10							RQD 78 FF 2	C-4		BASALT, slightly vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in poor condition, Percent Recovered 100.0%		
										12/20/2003		
15							RQD 26 FF 2.2	C-5		BASALT, moderately vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
5												
20												

03/11/04



LOG OF TEST BORING

Start Card R 65799

Job No. OL-3502

SR 270

Elevation 2540.8 (774.4 m)

HOLE No. H-45-03

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller James Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 64 FF 2.2		C-6		BASALT, moderately vesicular, medium grained, slightly weathered, moderately strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
25							RQD 95 FF 1.2		C-7		BASALT, moderately vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
30							RQD 98 FF 0.4		C-8		BASALT, moderately vesicular, medium grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
35							RQD 50 FF 2.8		C-9		BASALT, moderately vesicular, medium grained, moderately weathered, moderately weak rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, altered zones within rock mass 35.0 - 39.0', Percent Recovered 94.0%		
40											End of test hole boring at 40 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed water level, stabilized at 22.5 ft in 1 hour		
45													

Start Card R 65800

Job No. OL-3502

SR 270

Elevation 2520.9 ft (768.4 m)

HOLE No. H-46-04

Sheet 1 of 2

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 14, 2004

Completion January 14, 2004

Weil ID# AHP 464

Equipment CME 850 w/ autohammer

Station 358+50

Offset

Casing HQ 3.5"

Method Wet Rotary

Northing 859145.42

Easting 2833156.3

Latitude

Longitude

County Whitman

Subsection SW/SW

Section 32 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5								S-1			SILT with organics and some sand, very loose, greenish gray, moist, Homogeneous, no HCl reaction		
2							2 2 2 (4)	D-2			SILT with sand lenses and organics, very loose, greenish gray, moist, Homogeneous, no HCl reaction		
10							3 6 6 (12)	D-3		GS MC	SP, M.C. = 15% Poorly graded SAND with gravel, medium dense, light brownish gray, wet, Homogeneous, no HCl reaction		
15							31 52 (52)	D-4			Silty GRAVEL, decomposed bedrock, angular, very dense, dark gray, moist, Homogeneous, no HCl reaction, Note contact with possible bedrock at 12.5		
20							RQD 65 FF 3.2	C-5			BASALT, moderately vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are very closely spaced and in good condition, Percent Recovered 100.0%		



LOG OF TEST BORING

Start Card R 65800

Job No. OL-3502

SR 270

Elevation 2520.9 ft (768.4 m)

HOLE No. H-46-04

Sheet 2 of 2

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 100 FF .2		C-6		BASALT, slightly vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in excellent condition, Percent Recovered 100.0%		
25													
8											End of test hole boring at 26 ft below ground elevation.		
											This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
9													
30													
10													
35													
11													
40													
12													
45													
13													

Start Card R 65800

Job No. OL-3502 SR 270

Elevation 2552.0 ft (777.8 m)

HOLE No. H-47-04

Sheet 1 of 3

Project Pullman to Moscow Line work.

Driller Fetterly Lic# 2708

Site Address _____

Inspector Hanning

Start January 13, 2004 Completion January 13, 2004 Well ID# AHP 465 Equipment CME 850 w/ autohammer

Station 368+40 Offset Casing HQ 3.5" Method Wet Rotary

Northing 858357.27 Easting 2834055.25 Latitude _____ Longitude _____

County Whitman Subsection SW/SW Section 32 Range 46 EWM Township 15N

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1													
5							5 5 5 (10)	D-1			SILT with organics and trace gravel, loose, brown, moist, Homogeneous, no HCl reaction		
10							5 8 9 (17)	D-2	GS MC AL HYD		CL, MC=21%, PI=19 Lean CLAY, very stiff, brown, moist, Homogeneous, no HCl reaction		
15							>>	D-3			Silty GRAVEL, decomposed bedrock with infill, angular, very dense, dark brown, moist, Homogeneous, no HCl reaction, Note contact with possible bedrock at 12.5		
20							21 43 60 (103) RQD 50 FF 2.2	C-4			BASALT, highly vesicular with yellow and pink silty infill, medium grained, moderately weathered, very weak rock, no HCl reaction. Discontinuities are very closely spaced and in poor condition, Percent Recovered 92.0%		



LOG OF TEST BORING

Start Card R 65800

Job No. OL-3502

SR 270

Elevation 2552.0 ft (777.8 m)

HOLE No. H-47-04

Sheet 2 of 3

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
7							RQD 65 FF 2.8		C-5		BASALT, highly vesicular with yellowish infill and iron stained, fine grained, moderately weathered, very weak rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 97.0%		
25							RQD 11 FF 20		C-6		BASALT, slightly vesicular some silty infill and iron staining, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in fair condition, Percent Recovered 100.0%		
8													
9													
30							RQD 0 FF 18		C-7		BASALT, slightly vesicular, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are very closely spaced and in fair condition, Percent Recovered 100.0%		
10													
35							RQD 98 FF .2		C-8		BASALT, moderately vesicular, fine grained, fresh, strong rock, no HCl reaction. Discontinuities are moderately spaced and in good condition, Percent Recovered 100.0%		
11													
12							RQD 72 FF 2.4		C-9		BASALT, moderately vesicular, fine grained, slightly weathered, strong rock, no HCl reaction. Discontinuities are closely spaced and in good condition, Percent Recovered 98.0%		
40													
13													
45													



Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 65800

Job No. OL-3502

SR 270

Elevation 2552.0 ft (777.8 m)




HOLE No. H-47-04

Sheet 3 of 3

Project Pullman to Moscow Line work.

Driller Fetterly

Lic# 2708

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
14											<p>End of test hole boring at 45.5 ft below ground elevation.</p> <p>This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.</p>		
15													
50													
16													
55													
17													
18													
60													
19													
65													
20													
21													
70													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-1

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic East Airport Rd.

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested, Water entering pit at 7ft. Rock contact at 7ft. Pit 46ft from fogline. Pictures 67-72		
5													
2											12/15/2004 Water entering pit at 6.7 ft. Rock contact at 7 ft. Test pit 46 ft. from fogline. Pictures 67-72		
10											End of test hole boring at 7 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
4													
15													
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-2

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic.East Airport Rd.

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing _____ Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested, Rock contact at 5 ft. No water. Pit 34ft. from fogline. Pictures 53-55.		
5											End of test hole boring at 5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
2													
3													
4													
15													
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-3

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd East

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1								B	B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5													
2													
10													
3								B	B-2		Sandy SILT, loose, gray, moist, Homogeneous, HCl reaction not tested, Water entering pit at 6.9 ft. No rock contact. Pit 35 ft from fogline. Pictures 48-49		
4													
15											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-4

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5											12/15/2004	▽	
2									B-2		Sandy SILT, loose, brown, moist, Homogeneous, HCl reaction not tested, Water entering pit at 4.4ft.		
10									B-3		Poorly graded SAND, with fine gravel and silt, loose, brown, wet, Homogeneous, HCl reaction not tested, Contact with sand at 9.0 ft. No contact with bedrock. pit 31 ft from fogline. Pictures 43-47		
4											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
15													
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-5

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1								B	B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5								B	B-2		Silty SAND with gravel, loose, brown, wet, Homogeneous, HCl reaction not tested, Water entering pit at 5.4 ft. Contact with sand at 4.9 ft. No contact with rock. Pit 29 ft from fogline. Pictures 35-42	▽	
10											12/15/2004		
15											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-6

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5											12/15/2004	▽	
2									B-2		Sandy SILT, loose, gray, moist, Homogeneous, HCl reaction not tested, Water entering pit at 3.9 ft.		
10									B-3		Silty SAND, with some gravel, loose, brown, wet, Homogeneous, HCl reaction not tested, No contact with bedrock. Pit 38 ft. from fogline. Pictures 18-23		
4											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
15													
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-7

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 15, 2004 Completion December 15, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1								B	B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5													
2													
10								B	B-2		Elastic SILT, soft, bluish gray, wet, Homogeneous, HCl reaction not tested, Water entering pit at 5.9 ft. Color change 6.1 ft to bluish gray.		
3													
4								B	B-3		Silty SAND with gravel, loose, grayish brown, wet, Homogeneous, HCl reaction not tested, No contact with bedrock. Pit 38 ft. from fogline. Pictures 56-60		
15											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-8

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 14, 2004 Completion December 14, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1								B	B-1		Sandy ORGANIC SOIL with gravel, and silt, soft, brown, moist, Homogeneous, HCl reaction not tested		
5													
10													
15								B	B-2		Silty SAND with gravel, loose, brown, wet, Homogeneous, HCl reaction not tested, Water entering pit at 3.9 ft. Contact with sand at 11.0 ft. No contact with bedrock. Pit 35ft. from fogline. Pictures taken.		
20											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-9

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 14, 2004 Completion December 14, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy ORGANIC SOIL, with silt, soft, brown, moist, Homogeneous, HCl reaction not tested 12/14/2004		
5													
2													
10									B-2		Silty SAND with gravel, loose, brown, wet, Homogeneous, HCl reaction not tested, Water entering pit at 3.9 ft. Contact sand at 11.0 ft. No contact with bedrock. Pit 35 ft. from fogline. Pictures taken.		
4													
15													
5											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-10

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 14, 2004 Completion December 14, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1								B	B-1		Sandy SILT, loose, brown, moist, Homogeneous, HCl reaction not tested, Contact with bedrock at 4.9 ft.		
5											End of test hole boring at 5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
2													
10													
3													
4													
15													
5													
6													
20													



LOG OF TEST BORING

Start Card _____

Job No. OL-3502 SR 270 Elevation ft (m)

HOLE No. TP-11

Sheet 1 of 1

Project Pullman to Moscow Test Pits

Driller _____ Lic# _____

Site Address Vic. Airport Rd. East.

Inspector Hanning

Start December 14, 2004 Completion December 14, 2004 Well ID# _____ Equipment Case 9020 Excavator

Station _____ Offset _____ Casing NA Method Dig

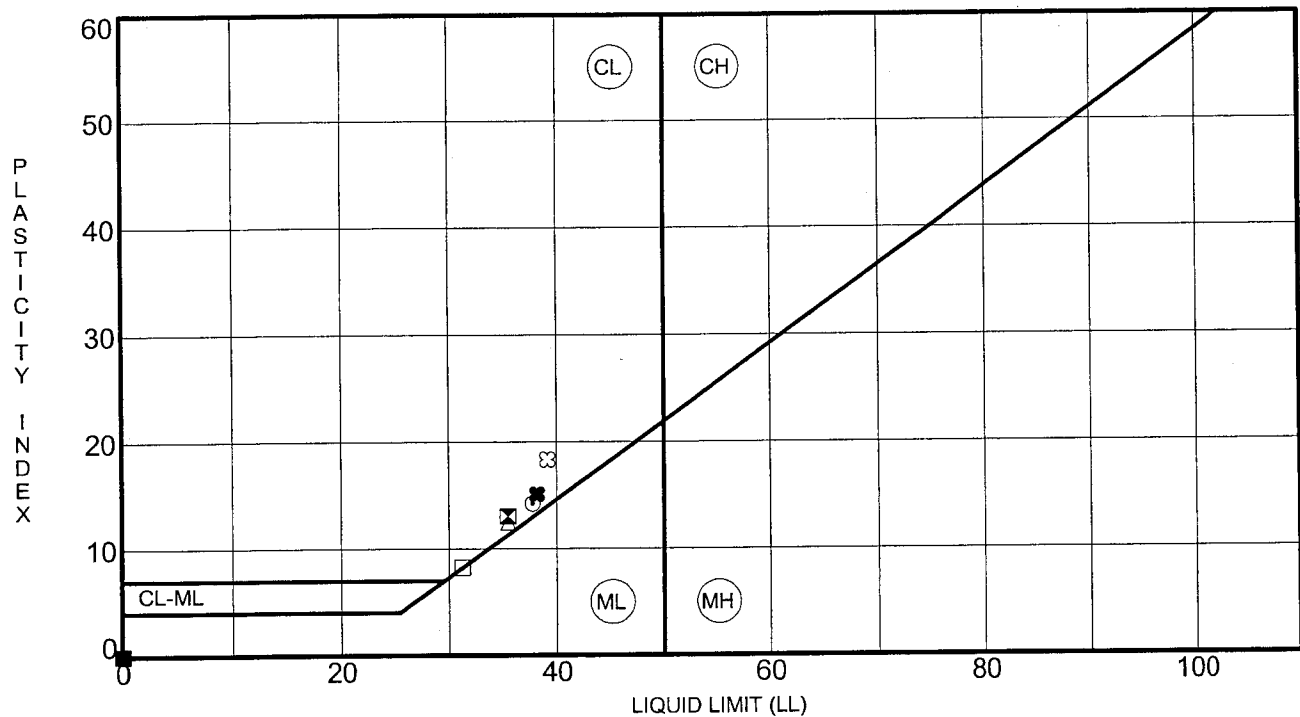
Northing _____ Easting _____ Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft				SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			10	20	30	40							
1									B-1		Sandy SILT, loose, brown, moist, Homogeneous, HCl reaction not tested		
5													
2													
10									B-2		Sandy Elastic SILT, soft, greenish gray, moist, Homogeneous, HCl reaction not tested		
3													
15									B-3		SILT with sand, loose, gray, moist, Homogeneous, HCl reaction not tested, No contact with bedrock. Pit 30 ft. from fogline. pictures taken.		
4													
15											End of test hole boring at 13 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
5													
6													
20													

Appendix B

Laboratory Test Results



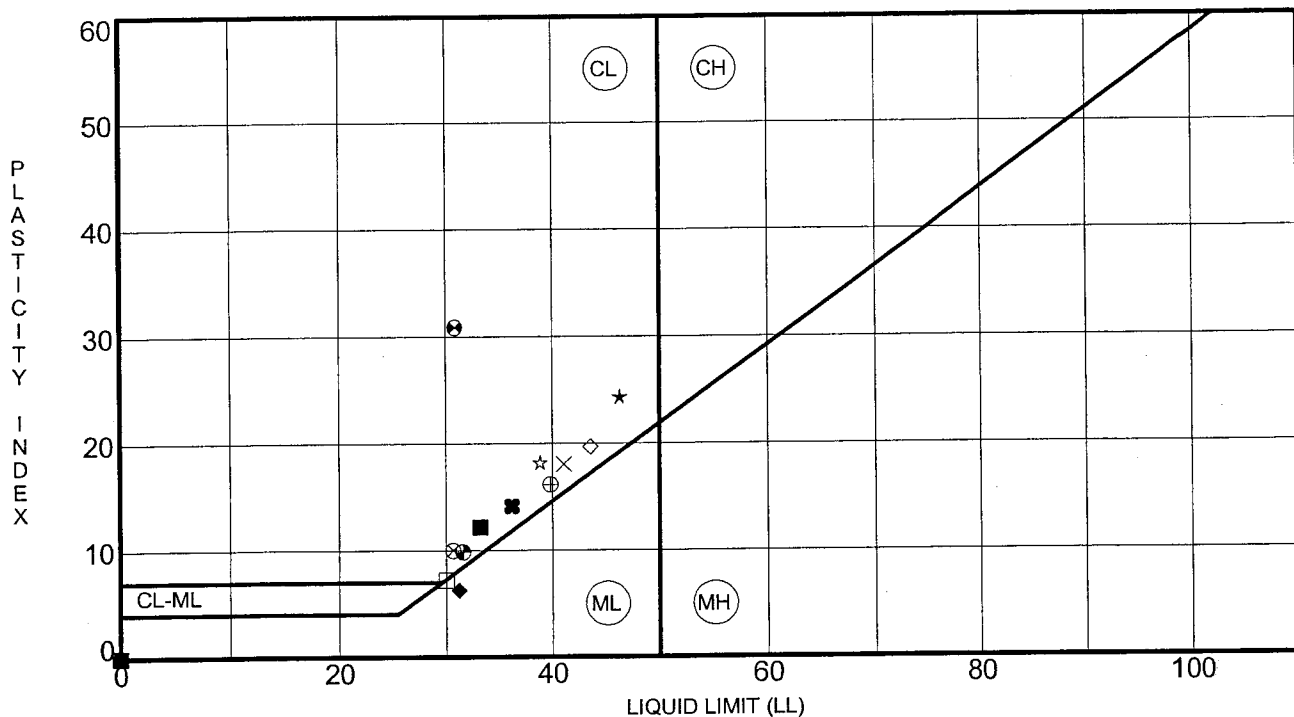
	Specimen Identification	LL	PL	PI	Fines	Classification
●	H-01-01 7.0	NP	NP	NP	100.0	SILT ML
⊠	H-01-01 17.0	35	22	13	97.0	LEAN CLAY CL
▲	H-01-01 27.0	NP	NP	NP	100.0	SILT ML
★	H-01-01 37.0	NP	NP	NP	100.0	SILT ML
⊙	H-01-01 47.0	38	24	14	95.1	LEAN CLAY CL
⊕	H-01-01 57.0	NP	NP	NP	100.0	SILT ML
○	H-01-01 67.0	NP	NP	NP	100.0	SILT ML
△	H-01-04 11.0	35	23	12	99.2	LEAN CLAY CL
⊗	H-02-01 12.0	NP	NP	NP	100.0	SILT ML
⊕	H-02-01 22.0	NP	NP	NP	100.0	SILT ML
□	H-02-01 37.0	31	23	8	91.8	SILT ML
⊕	H-02-01 47.0	NP	NP	NP	100.0	SILT ML
⊕	H-03-01 6.0	NP	NP	NP	100.0	SILT ML
☆	H-04-01 6.0	NP	NP	NP	100.0	SILT ML
⊗	H-04-01 11.0	39	21	18	97.2	LEAN CLAY CL
■	H-06-01 6.0	NP	NP	NP	100.0	SILT ML
◆	H-07-01 8.0	NP	NP	NP	100.0	SILT ML
◇	H-07-01 18.0	NP	NP	NP	100.0	SILT ML
×	H-07-01 23.0	NP	NP	NP	100.0	SILT ML
⊗	H-07-01 28.0	38	23	15	95.7	LEAN CLAY CL

PROJECT Pullman to Moscow Line work. -

JOB NO.
DATE

OL-3502
10/17/01

ATTERBERG LIMITS' RESULTS WSDOT



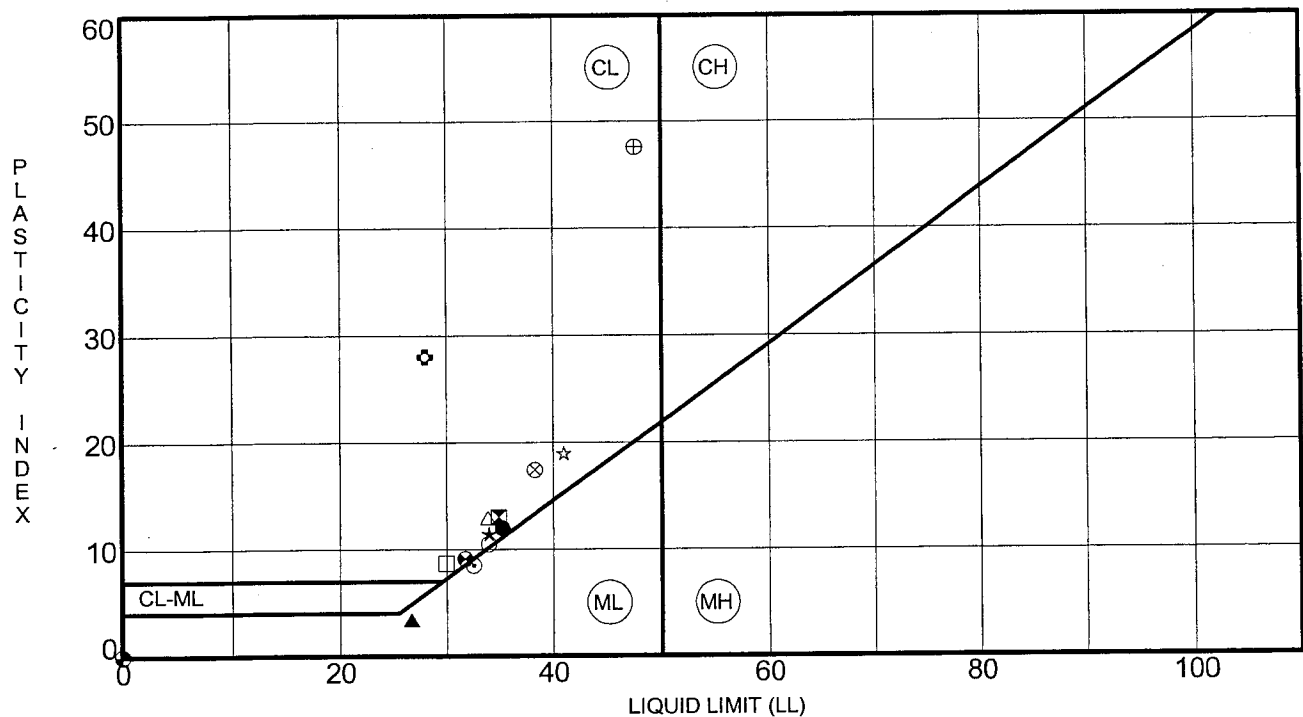
Specimen Identification	LL	PL	PI	Fines	Classification
● H-07-01	33.0	NP	NP	NP	100.0 SILT ML
⊠ H-08-01	7.0	NP	NP	NP	100.0 SILT ML
▲ H-08-01	17.0	NP	NP	NP	100.0 SILT ML
★ H-08-01	27.0	46	22	24	89.1 LEAN CLAY CL
⊙ H-08-01	37.0	NP	NP	NP	100.0 SILT ML
⊕ H-10-01	6.5	NP	NP	NP	100.0 SILT ML
○ H-10-01	16.5	NP	NP	NP	100.0 SILT ML
△ H-10-01	26.5	NP	NP	NP	100.0 SILT ML
⊗ H-11-04	4.0	31	21	10	99.5 LEAN CLAY CL
⊕ H-11-04	19.0	40	24	16	75.2 LEAN CLAY with SAND CL
□ H-12-04	4.0	30	23	7	74.3 SILT with SAND ML
⊕ H-12-04	14.0	31	NP	31	83.3 SILT with SAND ML
⊕ H-16-04	11.0	32	22	10	76.7 LEAN CLAY with SAND CL
★ H-17-04	7.0	39	21	18	99.0 LEAN CLAY CL
⊠ H-17-04	10.0	NP	NP	NP	16.4 SILTY SAND SM
■ H-18-04	6.0	33	21	12	75.7 LEAN CLAY with SAND CL
◆ H-18-04	14.0	31	25	6	27.4 SILTY SAND with GRAVEL SM
◇ H-19-04	3.5	44	24	20	99.1 LEAN CLAY CL
× H-19-04	13.5	41	23	18	99.2 LEAN CLAY CL
⊠ H-20-04	10.0	36	22	14	99.5 LEAN CLAY CL

PROJECT Pullman to Moscow Line work. -

JOB NO.
DATE

OL-3502
2/4/04

ATTERBERG LIMITS' RESULTS WSDOT



Specimen Identification	LL	PL	PI	Fines	Classification
● H-20-04 23.0	35	23	12	32.8	CLAYEY SAND with GRAVEL SC
⊠ H-23-04 11.0	35	22	13	72.6	LEAN CLAY with SAND CL
▲ H-31-04 9.0	27	23	3	98.5	SILT ML
★ H-38-04 6.0	34	23	11	75.0	LEAN CLAY with SAND CL
⊙ H-38-04 10.7	33	24	9	95.7	SILT ML
⊛ H-38-04 11.0	28	NP	28	74.3	SILT with SAND ML
○ H-39-04 9.0	34	23	10	99.6	LEAN CLAY CL
△ H-40-04 8.5	34	21	13	99.4	LEAN CLAY CL
⊗ H-40-04 18.5	38	21	17	98.3	LEAN CLAY CL
⊕ H-41-04 9.0	48	NP	48	28.4	SILTY SAND with GRAVEL SM
□ H-43-04 6.0	30	21	9	75.3	LEAN CLAY with SAND CL
⊗ H-43-04 9.0	32	23	9	70.8	LEAN CLAY with SAND CL
⊕ H-43-04 14.0	NP	NP	NP	15.4	SILTY SAND with GRAVEL SM
☆ H-47-04 9.0	41	22	19	99.7	LEAN CLAY CL

PROJECT Pullman to Moscow Line work. -

JOB NO.

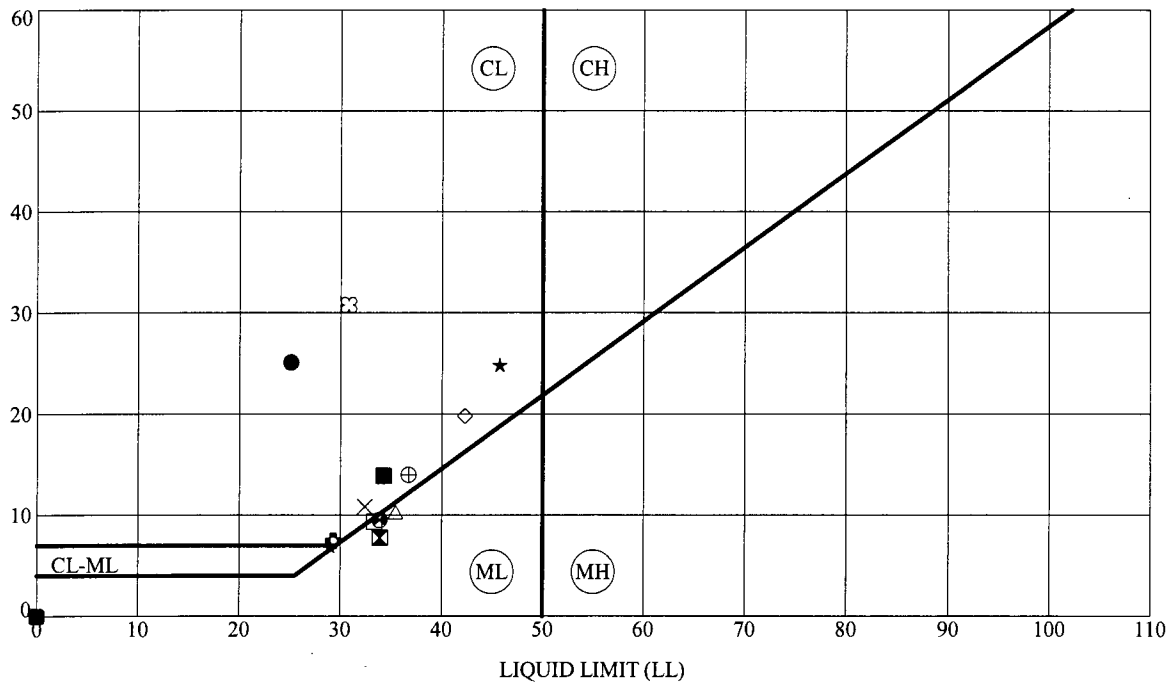
OL-3502

DATE

1/13/04

ATTERBERG LIMITS' RESULTS

WSDOT



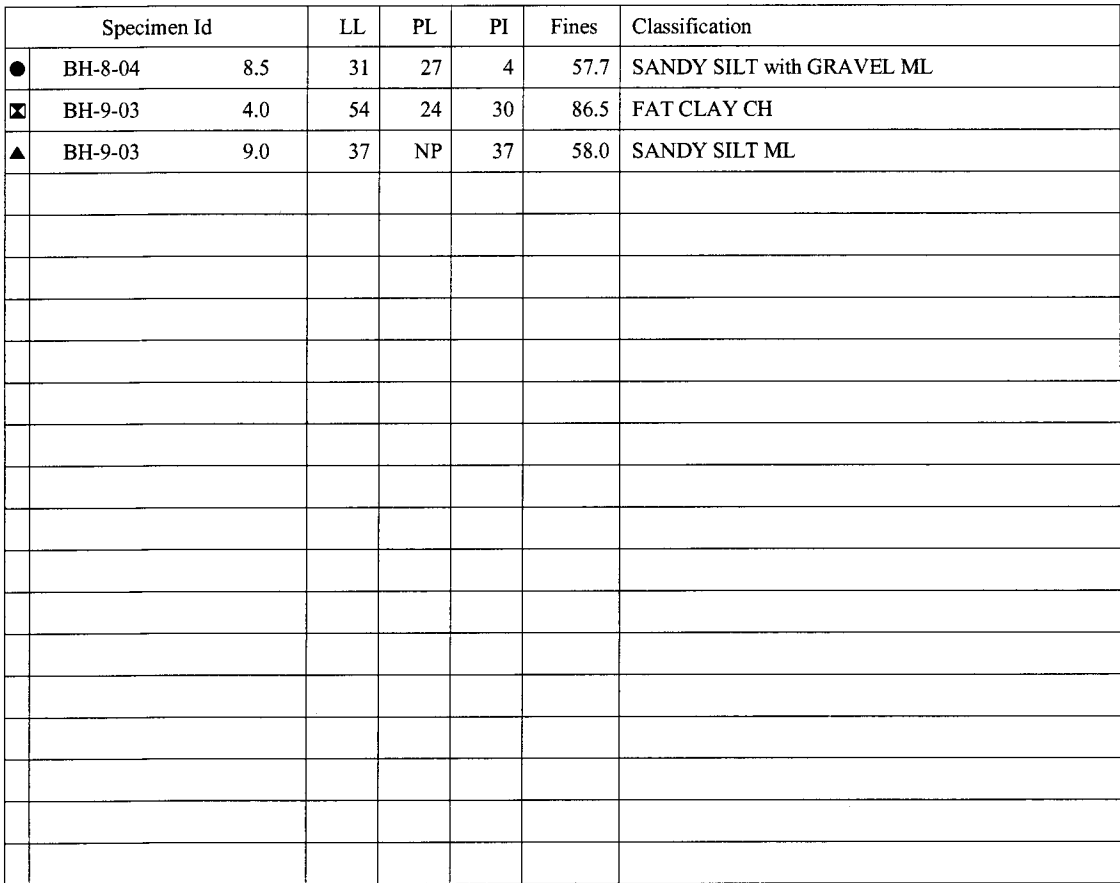
Specimen Id	LL	PL	PI	Fines	Classification
● BH-10-03 9.0	25	NP	25	47.6	SILTY SAND with GRAVEL SM
⊠ BH-1-04 12.0	34	26	8	77.8	SILT with SAND ML
▲ BH-1-04 15.0	NP	NP	NP	38.9	SILTY SAND SM
★ BH-12-03 6.5	46	21	25	94.3	LEAN CLAY CL
⊙ BH-12-03 9.5	NP	NP	NP	5.8	WELL-GRADED SAND with SILT and GRAVEL SW-SM
⊕ BH-13-03 6.5	29	22	7	65.6	SANDY SILTY CLAY CL-ML
○ BH-13-03 9.5	NP	NP	NP	5.4	WELL-GRADED SAND with SILT SW-SM
△ BH-14-04 7.0	35	25	10	66.8	SANDY SILT ML
⊗ BH-14-04 10.5	NP	NP	NP	17.6	SILTY SAND SM
⊕ BH-15-03 6.0	37	23	14	92.4	LEAN CLAY CL
□ BH-15-03 9.0	33	24	9	90.4	SILT ML
⊕ BH-2-04 5.0	34	24	10	89.9	SILT ML
⊕ BH-2-04 10.0	NP	NP	NP	31.1	SILTY SAND with GRAVEL SM
★ BH-3-04 4.0	29	22	7	68.3	SANDY SILTY CLAY CL-ML
⊠ BH-3-04 14.0	31	NP	31	24.8	SILTY SAND with GRAVEL SM
■ BH-4-04 11.0	34	20	14	96.5	LEAN CLAY CL
◆ BH-4-04 19.0	NP	NP	NP	19.3	SILTY SAND SM
◇ BH-5-04 10.0	42	23	20	75.0	LEAN CLAY with SAND CL
× BH-6-04 7.0	32	22	11	75.6	LEAN CLAY with SAND CL
⊕ BH-7-04 12.0	NP	NP	NP	7.7	WELL-GRADED SAND with SILT and GRAVEL SW-SM

PROJECT Pullman to Moscow (Structures) -

JOB NO. OL-3502
DATE 1/21/04

ATTERBERG LIMITS' RESULTS

wsdot



wslot

Job No. OL-3502

Hole No. BH-1-04

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 12.0	3.66	D-4	ML	See Boring Log	SILT with SAND	37	34	26	8
☒ 15.0	4.57	D-5	SM	See Boring Log	SILTY SAND	29			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	22.2	77.8		
☒ 0.8	60.3	38.9		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒ 0.157	0.11			

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Gravel

Sand

Silt and Clay

Job No.	OL-3502				Date	April 13, 2005				Washington State Department of Transportation				
Hole No.	BH-2-04				Sheet	1 of 1				Laboratory Summary				
Project	Pullman to Moscow (Structures)													
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI						
● 5.0	D-1	ML	See Boring Log	SILT	31	34	24	10						
☒ 10.0	D-3	SM	See Boring Log	SILTY SAND with GRAVEL	12									

GRADATION FRACTIONS					Hydrometer Analysis									
%Gravel	%Sand	%Fines	Cc	Cu										
● 0.0	10.1	89.9												
☒ 30.6	38.3	31.1												

GRADATION VALUES				
D60	D50	D30	D20	D10
●				
☒ 2.690	1.24			

Grain Size in Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No.	OL-3502	Date	April 13, 2005	Washington State Department of Transportation			
Hole No.	BH-3-04	Sheet	1 of 1	Laboratory Summary			
Project	Pullman to Moscow (Structures)						
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL
4.0	D-1	CL-ML	See Boring Log	SANDY SILTY CLAY	23	29	22
14.0	D-4	SM	See Boring Log	SILTY SAND with GRAVEL	14	31	7

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.0	30.8	68.3		
☒	22.1	53.1	24.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒	2.024	1.09	0.18		

Hydrometer Analysis

Job No.	OL-3502	Date	April 13, 2005					
Hole No.	BH-4-04	Sheet	1 of 1					
Project	Pullman to Moscow (Structures)							
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 11.0	D-3	CL	See Boring Log	LEAN CLAY	26	34	20	14
☒ 19.0	D-5	SM	See Boring Log	SILTY SAND	18			

Washington State
Department of Transportation

Laboratory Summary

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	3.5	96.5		
☒ 9.2	71.5	19.3		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒ 0.599	0.39	0.16	0.08	

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502

Hole No. BH-5-04

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 10.0	3.05	D-3	CL	See Boring Log	LEAN CLAY with SAND	26	42	23	19

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	25.0	75.0		

GRADATION VALUES

D60	D50	D30	D20	D10
●				

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Sieve / Size (mm)	Percent Finer (%)
3" (76.2)	100
3/4" (19.0)	100
#4 (4.75)	100
#10 (2.0)	100
#40 (0.425)	95
#60 (0.25)	85
#100 (0.15)	75
#200 (0.075)	0

Gravel

Sand

Silt and Clay

[illegible]

Job No. OL-3502		Date April 13, 2005		Washington State Department of Transportation					
Hole No. BH-7-04		Sheet 1 of 1		Laboratory Summary					
Project Pullman to Moscow (Structures)									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 12.0	3.66	D-4	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	18			

GRADATION FRACTIONS					US Sieve Opening In Inches		US Sieve Numbers		Hydrometer Analysis	
%Gravel	%Sand	%Fines	Cc	Cu	3"	3/4"	#4	#10	#40	#200
● 23.6	68.7	7.7	1.4	20.6						

GRADATION VALUES		Grain Size In Millimeter									
D60	D50	D30	D20	D10	Sand			Silt and Clay			
					Coarse	Medium	Fine				
● 2.458	1.60	0.64	0.39	0.119							

Sieve / Size (mm)	Percent Finer (%)
75	100
4.75	75
2.5	55
0.85	25
0.425	10

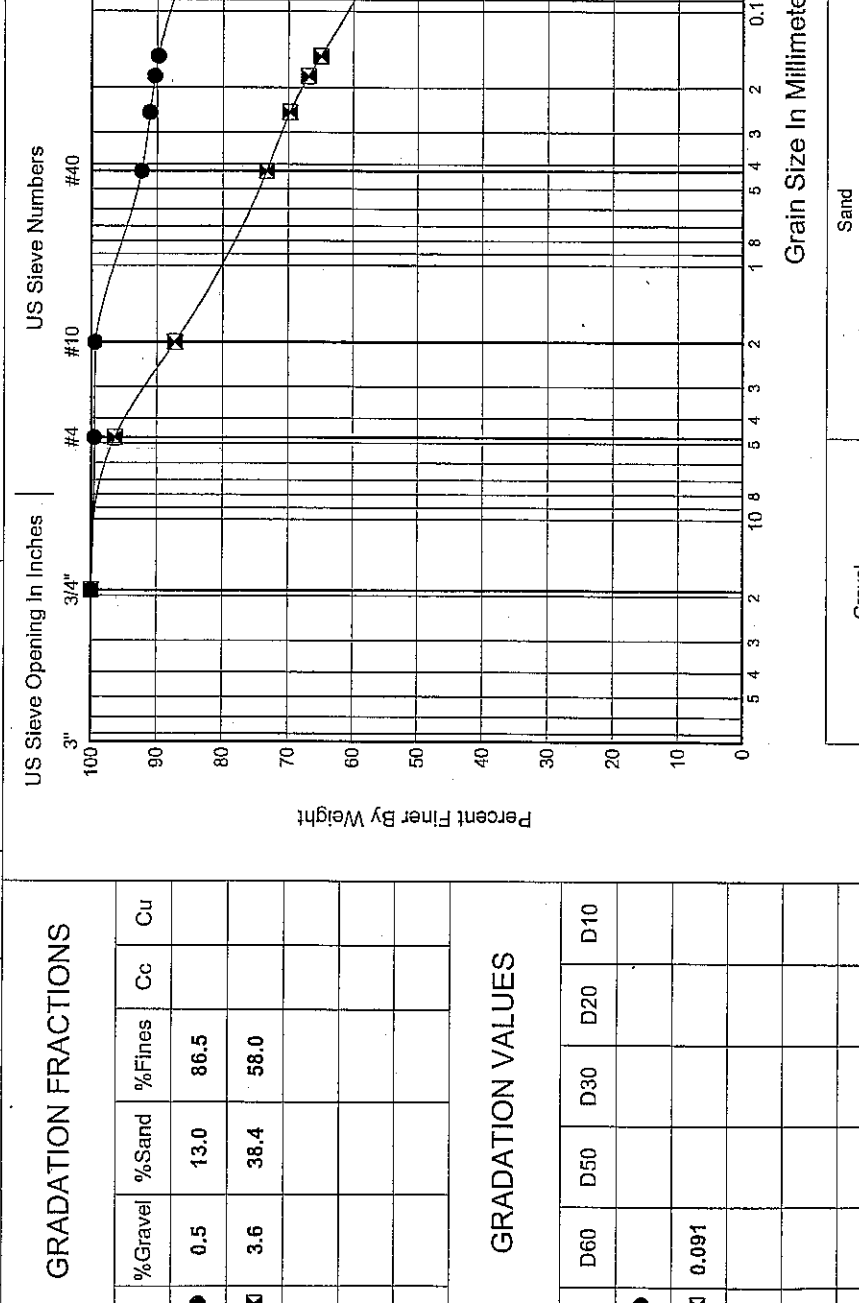
Job No. OL-3502				Date April 13, 2005		Washington State Department of Transportation			
Hole No. BH-8-04				Sheet 1 of 1		Laboratory Summary			
Project Pullman to Moscow (Structures)									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 8.5	2.59	D-2	ML	See Boring Log	SANDY SILT with GRAVEL and wood chunks	35	31	27	4

GRADATION FRACTIONS					US Sieve Opening In Inches		US Sieve Numbers		Hydrometer Analysis	
%Gravel	%Sand	%Fines	Cc	Cu	3"	3/4"	#4	#10	#40	#200
● 16.1	26.3	57.7								

GRADATION VALUES		Grain Size In Millimeter												
D60	D50	D30	D20	D10	Sand					Silt and Clay				
					Coarse	Medium	Fine							
● 0.153														

Grain Size (mm)	Percent Finer (%)
10	100
4.75	85
2.5	65
1.18	45
0.6	35
0.075	16

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 4.0	1.22	D-1	CH	See Boring Log	FAT CLAY	21	54	24	30
☒ 9.0	2.74	D-2	ML	See Boring Log	SANDY SILT	33	37		



Job No. OL-3502

Hole No. BH-10-03

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 9.0	2.74	D-4	SM	See Boring Log	SILTY SAND with GRAVEL	18	25		

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 19.0	33.4	47.6		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.320	0.10			

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502

Hole No. BH-12-03

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 6.5	1.98	D-2	CL	See Boring Log	LEAN CLAY	37	46	21	25
☒ 9.5	2.90	D-3	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	15			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	5.7	94.3		
☒ 16.5	77.7	5.8	1.0	14.2

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒ 2.164	1.42	0.58	0.34	0.152

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel			Sand			Silt and Clay		
			Coarse	Medium	Fine			

Job No. OL-3502		Date April 13, 2005		Washington State Department of Transportation					
Hole No. BH-13-03		Sheet 1 of 1		Laboratory Summary					
Project Pullman to Moscow (Structures)									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 6.5	1.98	D-2	CL-ML	See Boring Log	SANDY SILTY CLAY	28	29	22	7
☒ 9.5	2.90	D-3	SW-SM	See Boring Log	WELL-GRADED SAND with SILT	15			

GRADATION FRACTIONS					US Sieve Opening In Inches		US Sieve Numbers		Hydrometer Analysis	
	%Gravel	%Sand	%Fines	Cc	Cu	3"	3/4"	#10	#40	#200
●	0.3	34.1	65.6							
☒	12.3	82.2	5.4	1.1	17.6					

GRADATION VALUES		Grain Size In Millimeter									
		Gravel			Sand			Silt and Clay			
		D60	D50	D30	D20	D10	Coarse	Medium	Fine		
●											
☒	1.760	1.11	0.44	0.22	0.100						

Job No. OL-3502

Hole No. BH-14-04

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 7.0	2.13	D-2	ML	See Boring Log	SANDY SILT	33	35	25	10
☒ 10.5	3.20	D-4	SM	See Boring Log	SILTY SAND	17			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 1.7	31.6	66.8		
☒ 4.8	77.6	17.6		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒ 0.782	0.52	0.23	0.11	

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel Sand Coarse Medium Fine Silt and Clay

Job No. OL-3502

Hole No. BH-15-03

Project Pullman to Moscow (Structures)

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 6.0	1.83	D-2	CL	See Boring Log	LEAN CLAY	31	37	23	14
☒ 9.0	2.74	D-3	ML	See Boring Log	SILT	29	33	24	9

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.4	7.2	92.4		
☒	0.1	9.5	90.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay	
	Coarse	Medium	Fine		

Job No. OL-3502

Hole No. H-01-01

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 3

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 7.0	2.13	D-1	ML	See Boring Log	SILT	25			
☒ 17.0	5.18	D-3	CL	See Boring Log	LEAN CLAY	29	35	22	13
▲ 27.0	8.23	D-5	ML	See Boring Log	SILT	27			
★ 37.0	11.28	D-7	ML	See Boring Log	SILT	30			
◎ 47.0	14.33	D-9	CL	See Boring Log	LEAN CLAY	34	38	24	14

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.0	100.0		
☒	0.0	3.0	97.0		
▲	0.0	0.0	100.0		
★	0.0	0.0	100.0		
◎	0.0	4.9	95.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					
◎					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Percent Finer By Weight

Grain Size In Millimeter

Gravel

Sand

Silt and Clay

Job No.	OL-3502	Date	April 13, 2005
Hole No.	H-01-01	Sheet	2 of 3
Project	Pullman to Moscow Line work.		

Depth (ft)	Depth (m)	USCS	Color	Description	MC%	LL	PL	PI
● 57.0	17.37	D-13 ML	See Boring Log	SILT	33			
☒ 67.0	20.42	D-11 ML	See Boring Log	SILT	31			

GRADATION FRACTIONS					Hydrometer Analysis				
%Gravel	%Sand	%Fines	Cc	Cu	#4	#10	#40	#200	
● 0.0	0.0	100.0							
☒ 0.0	0.0	100.0							

GRADATION VALUES				
D60	D50	D30	D20	D10
●				
☒				

Percent Finer By Weight																																																																																																																																																																																																																																									
Grain Size In Millimeter																																																																																																																																																																																																																																									
100	90	80	70	60	50	40	30	20	10	0																																																																																																																																																																																																																															
5	4	3	2	10	6	5	4	3	2	1	.8	.6	.5	.4	.3	.25	.2	.18	.15	.125	.1	.075	.06	.05	.04	.03	.025	.02	.018	.016	.015	.014	.0125	.011	.01	.009	.008	.0075	.007	.006	.005	.004	.003	.0025	.002	.0018	.0016	.0015	.0014	.00125	.0011	.001	.0009	.0008	.00075	.0007	.0006	.0005	.0004	.0003	.00025	.0002	.00018	.00016	.00015	.00014	.000125	.00011	.0001	.00009	.00008	.000075	.00007	.00006	.00005	.00004	.00003	.000025	.00002	.000018	.000016	.000015	.000014	.0000125	.000011	.00001	.000009	.000008	.0000075	.000007	.000006	.000005	.000004	.000003	.0000025	.000002	.0000018	.0000016	.0000015	.0000014	.00000125	.0000011	.000001	.0000009	.0000008	.00000075	.0000007	.0000006	.0000005	.0000004	.0000003	.00000025	.0000002	.00000018	.00000016	.00000015	.00000014	.000000125	.00000011	.0000001	.00000009	.00000008	.000000075	.00000007	.00000006	.00000005	.00000004	.00000003	.000000025	.00000002	.000000018	.000000016	.000000015	.000000014	.0000000125	.000000011	.00000001	.000000009	.000000008	.0000000075	.000000007	.000000006	.000000005	.000000004	.000000003	.0000000025	.000000002	.0000000018	.0000000016	.0000000015	.0000000014	.00000000125	.0000000011	.000000001	.0000000009	.0000000008	.00000000075	.0000000007	.0000000006	.0000000005	.0000000004	.0000000003	.00000000025	.0000000002	.00000000018	.00000000016	.00000000015	.00000000014	.000000000125	.00000000011	.0000000001	.00000000009	.00000000008	.000000000075	.00000000007	.00000000006	.00000000005	.00000000004	.00000000003	.000000000025	.00000000002	.000000000018	.000000000016	.000000000015	.000000000014	.0000000000125	.000000000011	.00000000001	.000000000009	.000000000008	.0000000000075	.000000000007	.000000000006	.000000000005	.000000000004	.000000000003	.0000000000025	.000000000002	.0000000000018	.0000000000016	.0000000000015	.0000000000014	.00000000000125	.0000000000011	.000000000001	.0000000000009	.0000000000008	.00000000000075	.0000000000007	.0000000000006	.0000000000005	.0000000000004	.0000000000003	.00000000000025	.0000000000002	.00000000000018	.00000000000016	.00000000000015	.00000000000014	.000000000000125	.00000000000011	.0000000000001	.00000000000009	.00000000000008	.000000000000075	.00000000000007	.00000000000006	.00000000000005	.00000000000004	.00000000000003	.000000000000025	.00000000000002	.0000000000000

Job No. OL-3502

Hole No. H-01-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 3 of 3

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 11.0	3.35	D-2	CL	See Boring Log	LEAN CLAY	30	35	23	12

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	0.8	99.2		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.019	0.01	0.00		

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size in Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502

Hole No. H-02-01

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 12.0	3.66	D-2	ML	See Boring Log	SILT	25			
☒ 22.0	6.71	D-4	ML	See Boring Log	SILT	30			
▲ 37.0	11.28	D-7	ML	See Boring Log	SILT	28	31	23	8
★ 47.0	14.33	D-9	ML	See Boring Log	SILT	29			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	0.0	100.0		
☒ 0.0	0.0	100.0		
▲ 0.0	8.2	91.8		
★ 0.0	0.0	100.0		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒				
▲				
★				

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Gravel

Sand

Silt and Clay

Grain Size In Millimeter

[illegible]

Job No. OL-3502		Date April 13, 2005		Washington State Department of Transportation					
Hole No. H-04-01		Sheet 1 of 1		Laboratory Summary					
Project Pullman to Moscow Line work.									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 6.0	1.83	D-1	ML	See Boring Log	SILT	24			
☒ 11.0	3.35	D-2	CL	See Boring Log	LEAN CLAY	25	39	21	18

GRADATION FRACTIONS					US Sieve Opening in Inches		US Sieve Numbers					Hydrometer Analysis									
%Gravel	%Sand	%Fines	Cc	Cu	3"	3/4"	#4	#10	#40	#200	10.0	2.0	0.85	0.425	0.25	0.15	0.075	0.045	0.025	0.015	0.0075
● 0.0	0.0	100.0																			
☒ 0.0	2.8	97.2																			

GRADATION VALUES									
D60	D50	D30	D20	D10					
●									
☒									

Grain Size in Millimeter

Gravel			Sand			Silt and Clay	
			Coarse	Medium	Fine		

[illegible]

Job No. OL-3502

Hole No. H-07-01

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 8.0	2.44	D-1	ML	See Boring Log	SILT	24			
☒ 18.0	5.49	D-3	ML	See Boring Log	SILT	22			
▲ 23.0	7.01	D-4	ML	See Boring Log	SILT	28			
★ 28.0	8.53	D-5	CL	See Boring Log	LEAN CLAY	23	38	23	15
⊙ 33.0	10.06	D-6	ML	See Boring Log	SILT	37			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.0	100.0		
☒	0.0	0.0	100.0		
▲	0.0	0.0	100.0		
★	0.0	4.3	95.7		
⊙	0.0	0.0	100.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					
⊙					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Percent Finer By Weight

Grain Size In Millimeter

Gravel

Sand

Silt and Clay

Job No. OL-3502

Hole No. H-07-03

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 5.0	1.52	S-3	CL	See Boring Log	SANDY LEAN CLAY	23	39	24	15
☒ 12.0	3.66	S-8	SM	See Boring Log	SILTY SAND	49			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.6	32.1	67.4		
☒ 0.0	62.3	37.7		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒ 0.184	0.13			

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502

Hole No. H-08-01

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 7.0	2.13	D-1	ML	See Boring Log	SILT	21			
☒ 17.0	5.18	D-3	ML	See Boring Log	SILT	26			
▲ 27.0	8.23	D-5	CL	See Boring Log	LEAN CLAY	21	46	22	24
★ 37.0	11.28	D-7	ML	See Boring Log	SILT	29			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.0	100.0		
☒	0.0	0.0	100.0		
▲	0.0	10.9	89.1		
★	0.0	0.0	100.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Percent Finer By Weight

Grain Size In Millimeter

Gravel

Sand

Silt and Clay

Job No. OL-3502

Hole No. H-08-03

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 8.6	2.62	SH-4	ML	See Boring Log	SILT with SAND	N/A	26		
☒ 9.8	2.99	SH-5	ML	See Boring Log	SANDY SILT	27	27	23	4
▲ 10.1	3.08	SH-5	ML	See Boring Log	SILT with SAND	32	29	23	6
★ 10.6	3.23	SH-5	CL-ML	See Boring Log	SILTY CLAY with SAND	29	28	21	7
◎ 29.0	8.84	D-10	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	11			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	20.8	79.2		
☒	0.0	36.8	63.2		
▲	0.0	26.6	73.4		
★	0.0	23.9	76.1		
◎	40.9	52.3	6.8	2.8	37.3

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					
◎	4.895	3.49	1.34	0.45	0.131

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel Sand Coarse Medium Fine Silt and Clay

Job No. OL-3502

Hole No. H-10-01

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 6.5	1.98	D-1	ML	See Boring Log	SILT	26			
☒ 16.5	5.03	D-3	ML	See Boring Log	SILT	21			
▲ 26.5	8.08	D-5	ML	See Boring Log	SILT	19			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.0	100.0		
☒	0.0	0.0	100.0		
▲	0.0	0.0	100.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

3"	3/4"	#4	#10	#40	#200
100	100	100	100	100	100

Gravel

Sand

Silt and Clay

Job No.	OL-3502	Date	April 13, 2005					
Hole No.	H-10-04	Sheet	1 of 1					
Project	Pullman to Moscow Line work.							
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 5.0	D-1	CL	See Boring Log	LEAN CLAY with SAND	19	29	20	9
☒ 10.0	S-2	CL	See Boring Log	LEAN CLAY with SAND	30	43	23	20

Washington State
Department of Transportation

Laboratory Summary

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	25.8	74.2		
☒ 0.0	27.8	72.2		

GRADATION VALUES

D60	D50	D30	D20	D10
●				
☒				

Hydrometer Analysis

The graph plots Percent Finer By Weight against Grain Size In Millimeter on a semi-logarithmic scale. Key points include 100% finer at 3 inches, approximately 95% finer at 0.075mm, about 85% finer at 0.425mm, and approximately 70% finer at 0.85mm and larger.

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502				Date April 13, 2005		Washington State Department of Transportation			
Hole No. H-11-04				Sheet 1 of 1		Laboratory Summary			
Project Pullman to Moscow Line work.									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 4.0	1.22	D-1	CL	See Boring Log	LEAN CLAY	16	31	21	10
☒ 19.0	5.79	D-5	CL	See Boring Log	LEAN CLAY with SAND	48	40	24	16

GRADATION FRACTIONS				
%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	0.5	99.5		
☒ 0.0	24.8	75.2		

GRADATION VALUES					
D60	D50	D30	D20	D10	
● 0.018	0.01	0.00			
☒					

US Sieve Opening In Inches

3" 3/4" #10 #40 #200

Hydrometer Analysis

US Sieve Numbers

#4 #10 #40 #200

Grain Size In Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No.	OL-3502	Date	April 13, 2005	Washington State Department of Transportation				
Hole No.	H-12-04	Sheet	1 of 1	Laboratory Summary				
Project	Pullman to Moscow Line work.							
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
4.0	D-1	ML	See Boring Log	SILT with SAND	19	30	23	7
9.8	S-2A	CL	See Boring Log	LEAN CLAY with SAND	22	33	23	10
10.1	S-2B	CL	See Boring Log	LEAN CLAY with SAND	19	42	23	19
10.6	S-2C	ML	See Boring Log	SANDY SILT (CU TEST)	27	36	25	11
14.0	D-4	ML	See Boring Log	SILT with SAND	38	31		

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	25.7	74.3		
☒	0.0	28.6	71.4		
▲	2.5	27.2	70.3		
★	0.0	30.2	69.8		
⊙	0.0	16.7	83.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					
⊙					

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel Sand Medium Fine Silt and Clay

Job No. OL-3502				Date April 13, 2005		Washington State Department of Transportation			
Hole No. H-16-04				Sheet 1 of 1		Laboratory Summary			
Project Pullman to Moscow Line work.									
Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 10.6	3.23	S-2	ML	See Boring Log	SANDY SILT (Moisture Content: Not available)	N/A	28	23	5
☒ 11.0	3.35	D-3	CL	See Boring Log	LEAN CLAY with SAND	27	32	22	10

GRADATION FRACTIONS				
%Gravel	%Sand	%Fines	Cc	Cu
● 1.4	31.5	67.2		
☒ 0.0	23.3	76.7		

GRADATION VALUES						
D60	D50	D30	D20	D10		
●						
☒						

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3502

Hole No. H-17-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 7.0	2.13	D-2	CL	See Boring Log	LEAN CLAY	23	39	21	18
☒ 10.0	3.05	D-3	SM	See Boring Log	SILTY SAND	17			

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	1.0	99.0		
☒ 13.9	69.7	16.4		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.019	0.01	0.00		
☒ 1.447	0.88	0.29	0.12	

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel

Sand

Silt and Clay

Job No.	OL-3502	Date	April 13, 2005	Washington State Department of Transportation				
Hole No.	H-18-04	Sheet	1 of 1	Laboratory Summary				
Project	Pullman to Moscow Line work.							
Depth (ft)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
6.0	D-2	CL	See Boring Log	LEAN CLAY with SAND	24	33	21	12
14.0	D-4	SM	See Boring Log	SILTY SAND with GRAVEL	22	31	25	6

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	24.3	75.7		
☒	20.2	52.3	27.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒	1.346	0.59	0.13		

Hydrometer Analysis

Grain Size In Millimeter

Percent Finer By Weight

Gravel

Sand
Coarse Medium Fine

Silt and Clay

Job No. OL-3502

Date April 13, 2005

Hole No. H-19-04

Sheet 1 of 1

Project Pullman to Moscow Line work.

Depth (ft)

3.5

Depth (m)

1.07

USCS

CL

Color

See Boring Log

Description

LEAN CLAY

MC%

22

LL

44

PL

24

PI

20

Depth (ft)

13.5

Depth (m)

4.11

USCS

CL

Color

See Boring Log

Description

LEAN CLAY

MC%

27

LL

41

PL

23

PI

18

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	0.9	99.1		
☒ 0.0	0.8	99.2		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.020	0.01			
☒ 0.016	0.01			

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Gravel

Coarse

Medium

Fine

Silt and Clay

Washington State
Department of Transportation

Laboratory Summary

Job No. OL-3502

Date April 13, 2005

Hole No. H-20-04

Sheet 1 of 1

Project Pullman to Moscow Line work.

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 8.8	2.68	SH-2	ML	See Boring Log	SANDY SILT (CU TEST)	35	32	31	1
☒ 9.1	2.77	SH-2	CL	See Boring Log	LEAN CLAY with SAND (CU TEST)	28	35	21	14
▲ 9.6	2.93	SH-2	CL	See Boring Log	LEAN CLAY with SAND (CU TEST)	25	34	21	13
★ 10.0	3.05	D-3	CL	See Boring Log	LEAN CLAY	26	36	22	14
◎ 23.0	7.01	D-7	SC	See Boring Log	CLAYEY SAND with GRAVEL	23	35	23	12

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.1	30.3	69.6		
☒	0.0	28.1	71.9		
▲	0.0	27.7	72.3		
★	0.0	0.5	99.5		
◎	27.1	40.1	32.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★	0.020	0.01			
◎	1.243	0.40			

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel Sand Silt and Clay

Coarse Medium Fine

Job No. OL-3502

Hole No. H-23-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 11.0	3.35	D-3	CL	See Boring Log	LEAN CLAY with SAND	26	35	22	13

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 4.3	23.1	72.6		

GRADATION VALUES

D60	D50	D30	D20	D10
●				

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Sieve / Size (mm)	Percent Finer (%)
3"	100
3/4"	95.7
#4	91.4
#10	87.1
#40	82.9
#200	78.6
0.075 mm	72.6
0.0075 mm	72.6

Grain Size In Millimeter

Gravel Sand Silt and Clay

Coarse Medium Fine

Job No. OL-3502

Hole No. H-31-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 9.0	2.74	D-2	ML	See Boring Log	SILT	30	27	23	4

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	1.5	98.5		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.024	0.02	0.01	0.00	

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel

Coarse

Medium

Fine

Silt and Clay

Job No. OL-3502

Hole No. H-38-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 5.5	1.68	S-1	ML	See Boring Log	SILT with SAND	42	40		
☒ 6.0	1.83	D-2	CL	See Boring Log	LEAN CLAY with SAND	31	34	23	11
▲ 10.7	3.26	S-3	ML	See Boring Log	SILT	29	33	24	9
★ 11.0	3.35	D-4	ML	See Boring Log	SILT with SAND	24	28		

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	27.2	72.8		
☒	0.0	25.0	75.0		
▲	0.0	4.3	95.7		
★	0.0	25.7	74.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					
▲					
★					

US Sieve Opening in Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size in Millimeter

Gravel: 3" to 3/4" (76.2 to 19.0 mm)
Sand: 3/4" to #4 (19.0 to 4.75 mm)
Medium: #4 to #10 (4.75 to 2.0 mm)
Fine: #10 to #200 (2.0 to 0.075 mm)
Silt and Clay: #200 and finer (0.075 mm and finer)

Job No. OL-3502

Date April 13, 2005

Hole No. H-39-04

Sheet 1 of 1

Project Pullman to Moscow Line work.

Depth (ft)

9.0

Depth (m)

2.74

USCS

CL

Sample No.

D-2

Color

See Boring Log

Washington State
Department of Transportation

Laboratory Summary

MC%

26

LL

34

PL

23

PI

11

Description

LEAN CLAY

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
0.0	0.4	99.6		

GRADATION VALUES

D60	D50	D30	D20	D10
0.027	0.02	0.00		

US Sieve Opening In Inches

3"

3/4"

#4

#10

#40

#200

US Sieve Numbers

Hydrometer Analysis

Percent Finer By Weight

Grain Size In Millimeter

Gravel

Sand

Coarse

Medium

Fine

Silt and Clay

Job No. OL-3502

Hole No. H-40-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 8.5	2.59	D-2	CL	See Boring Log	LEAN CLAY	22	34	21	13
☒ 18.5	5.64	D-4	CL	See Boring Log	LEAN CLAY	24	38	21	17

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	0.6	99.4		
☒ 0.0	1.7	98.3		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.020	0.01	0.00		
☒ 0.020	0.01	0.00		

US Sieve Opening in Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size in Millimeter

Gravel	Sand			Silt and Clay	
	Coarse	Medium	Fine		

Job No. OL-3502

Hole No. H-41-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 9.0	2.74	D-2	SM	See Boring Log	SILTY SAND with GRAVEL	34	48		

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 16.6	55.0	28.4		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.348	0.26	0.09		

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Gravel

Coarse

Medium

Fine

Silt and Clay

Job No. OL-3502

Hole No. H-42-03

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 10.6	3.23	S-3	ML	See Boring Log	SANDY SILT	26	32	24	8

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	41.7	58.3		

GRADATION VALUES

D60	D50	D30	D20	D10
● 0.089				

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

3"	3/4"	#4	#10	#40	#200
100	100	100	100	100	100

Grain Size In Millimeter

Gravel	Sand			Silt and Clay	
Coarse	Medium	Fine			

Job No. OL-3502

Hole No. H-43-04

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State
Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 5.2	1.58	S-1	ML	See Boring Log	SILT with SAND	23	26	22	4
⊠ 5.6	1.71	S-1	CL-ML	See Boring Log	SILTY CLAY with SAND	23	27	21	6
▲ 6.0	1.83	D-2	CL	See Boring Log	LEAN CLAY with SAND	24	30	21	9
★ 9.0	2.74	D-3	CL	See Boring Log	LEAN CLAY with SAND	27	32	23	9
⊙ 14.0	4.27	D-4	SM	See Boring Log	SILTY SAND with GRAVEL	15			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	25.3	74.7		
⊠	0.0	23.9	76.1		
▲	0.0	24.7	75.3		
★	0.3	29.0	70.8		
⊙	33.8	50.7	15.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙	3.750	2.56	0.59	0.18	

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel

Sand

Coarse

Medium

Fine

Silt and Clay

Job No. OL-3502

Hole No. H-44-03

Project Pullman to Moscow Line work.

Date April 13, 2005

Sheet 1 of 1

Washington State Department of Transportation

Laboratory Summary

Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
● 5.2	1.58	U-1	CL	See Boring Log	LEAN CLAY with SAND	32	41	24	17

GRADATION FRACTIONS

%Gravel	%Sand	%Fines	Cc	Cu
● 0.0	25.3	74.7		

GRADATION VALUES

D60	D50	D30	D20	D10
●				

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Grain Size In Millimeter

Gravel	Sand			Silt and Clay	
	Coarse	Medium	Fine		

Job No.	OL-3502	Date	April 13, 2005	Washington State Department of Transportation											
Hole No.	H-47-04	Sheet	1 of 1	Laboratory Summary											
Project	Pullman to Moscow Line work.	Color	See Boring Log												
Depth (ft)	9.0	Depth (m)	2.74	USCS	CL	Description	LEAN CLAY	MC%	21	LL	41	PL	22	PI	19

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.3	99.7		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.015	0.01			

Grain Size In Millimeter

Percent Finer By Weight

US Sieve Opening In Inches

US Sieve Numbers

Hydrometer Analysis

Gravel

Sand

Silt and Clay

Coarse

Medium

Fine

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - STATE MATERIALS LABORATORY
PO BOX 47365 OLYMPIA WA 98504-7365 / 1655 SOUTH 2ND AVE TUMWATER WA 98512

Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341178
Lab Number P -341178
Trans. No. 521987
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: SE 1/4 SE 1/4 Sec. 4 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-2-04 / (10'-20')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.865
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.)
Class (Round Agg.) 34

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 66

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Distribution:

Materials File

Region Construction 4

Project Engineer:

GEOTECH - J. STRUTHERS

Result: INFORMATIONAL

Remarks:

X

X(2)

THOMAS E. BAKER, P.E.

MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360) 709-5446

By: 

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

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Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341179
Lab Number P -341179
Trans. No. 521988
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: SE 1/4 SE 1/4 Sec. 4 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-3-04 / (10'-30')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.879
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 27
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 78

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat: (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Distribution:

Materials File

Region Construction

Project Engineer:

GEOTECH - J. STRUTHERS

Result: INFORMATIONAL

Remarks:

X

X(2)

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

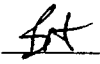
THOMAS E. BAKER, P.E.

MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360) 709-5446

By: 

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Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341180
Lab Number P -341180
Trans. No. 521989
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: SE 1/4 SE 1/4 Sec. 4 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-4-04 / (10'-30')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.920
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 19
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 88

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Distribution:

Materials File

Region Construction

Project Engineer:

GEOTECH - J. STRUTHERS

Result: INFORMATIONAL

Remarks:

X

X(2)

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

THOMAS E. BAKER, P.E.
MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360)709-5446

By: 

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Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341181
Lab Number P -341181
Trans. No. 521990
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: SW 1/4 SW 1/4 Sec. 3 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-5-04 / (10'-30')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.893
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 30
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 85

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL
Remarks:

Distribution:

Materials File

X

Region Construction

4

Project Engineer:

GEOTECH - J. STRUTHERS

X(2)

T42G-

T43L-

T44F-

T44Q-

T43A-1.0

T43M-

T44H-1.0

T44R-

T43B-

T44B-

T44J-

T44U-

T43D-1.0

T44D-1.0

T44L-

T45W-

T43H-

T44E-

T44M-

THOMAS E. BAKER, P.E.

MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360) 709-5446

By: 

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - STATE MATERIALS LABORATORY
PO BOX 47365 OLYMPIA WA 98504-7365 / 1655 SOUTH 2ND AVE TUMWATER WA 98512

Physical Testing Section
Preliminary Aggregate Test Report

Date Sampled: 03/30/2004
Sampled By:
Date Recvd HQ: 03/30/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Work Order No. OL3502
Lab ID No. 0000341197
Lab Number P -341197
Trans. No. 521997
Bid. Item No.
Org. No. 306320
F.A. No.

Material: AGGREGATE

Legal Description: SW 1/4 NW 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-21-04 (10'-30')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

2.761

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.)
Class (Round Agg.)

21

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113):

54

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL
Remarks:

Distribution:

Materials File

X

Region Construction

4

Project Engineer:

GEOTECH - J. STRUTHERS

X(2)

THOMAS E. BAKER, P.E.
MATERIALS ENGINEER

Donald Brouillard

By: 

Date: 04/10/2004

Phone: (360) 709-5446

T42G-	T43L-	T44F-	T44Q-
T43A-1.0	T43M-	T44H-1.0	T44R-
T43B-	T44B-	T44J-	T44U-
T43D-1.0	T44D-1.0	T44L-	T45W-
T43H-	T44E-	T44M-	

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - STATE MATERIALS LABORATORY
PO BOX 47365 OLYMPIA WA 98504-7365 / 1655 SOUTH 2ND AVE TUMWATER WA 98512

Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341175
Lab Number P -341175
Trans. No. 521992
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: NE 1/4 NW 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-25-04 / (5'-25')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.783
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 19
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 90

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)

(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL

Distribution:

Materials File

X

Region Construction

4

Project Engineer:

GEOTECH - J. STRUTHERS

X(2)

Remarks:

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

THOMAS E. BAKER, P.E.

MATERIALS ENGINEER

Donald Brouillard

By: DL

Date: 04/10/2004

Phone: (360) 709-5446

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Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341176
Lab Number P -341176
Trans. No. 521993
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: NE 1/4 NW 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC.

Sample Loc.: H-26-04 / (5'-20')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.798
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 20
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 90

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL

Distribution:

Materials File

X

Region Construction

4

Project Engineer:

GEOTECH - J. STRUTHERS

X(2)

Remarks:

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

THOMAS E. BAKER, P.E.
MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360) 709-5446

By: 

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Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341177
Lab Number P -341177
Trans. No. 521994
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/24/2004
Sampled By:
Date Recvd HQ: 03/25/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: NE 1/4 NW 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-27-04 / (5'-20')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.739
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 24
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 21

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL
Remarks:

Distribution:

Materials File X
Region Construction 4
Project Engineer:
GEOTECH - J. STRUTHERS X(2)

THOMAS E. BAKER, P.E.
MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360) 709-5446

By: 

aggtestp.dfr 3/03

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T44W-
T43H- T44E- T44M-

Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341195
Lab Number P -341195
Trans. No. 521995
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/30/2004
Sampled By:
Date Recvd HQ: 03/30/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: NE 1/4 NW 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-28-04 (5'-20')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.817
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 19
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 85

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL
Remarks:

Distribution:

Materials File X
Region Construction 4
Project Engineer:
GEOTECH - J. STRUTHERS X(2)

THOMAS E. BAKER, P.E.

MATERIALS ENGINEER

Donald Brouillard

Date: 04/10/2004

Phone: (360)709-5446

By: 

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - STATE MATERIALS LABORATORY
PO BOX 47365 OLYMPIA WA 98504-7365 / 1655 SOUTH 2ND AVE TUMWATER WA 98512

Physical Testing Section
Preliminary Aggregate Test Report

Work Order No. OL3502
Lab ID No. 0000341196
Lab Number P -341196
Trans. No. 521996
Bid. Item No.
Org. No. 306320
F.A. No.

Date Sampled: 03/30/2004
Sampled By:
Date Recvd HQ: 03/30/2004
S.R. No.: 270
Section: C.S. 3831
Contractor:

Material: AGGREGATE

Legal Description: NW 1/4 NE 1/4 Sec. 1 T. 14 N., R. 45 E. W.M.

Pit No.: P - UNC. Sample Loc.: H-30-04 (5'-25')

Coarse Aggregate (AASHTO T-85):

Bulk Specific Gravity (SSD) 2.769
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

Fine Aggregate (AASHTO T-84):

Bulk Specific Gravity (SSD)
Bulk Specific Gravity
Apparent Specific Gravity
Absorption (%)

LA Abrasion (AASHTO T-96):

Class A (Crushed Agg.) 20
Class (Round Agg.)

Sand Equivalent (AASHTO T-176; Pre-Wet Method):

Degradation Factor (WSDOT TM 113): 67

Organics (AASHTO T-21):

Asphalt Content-Recycle Mat. (Std. Spec. 9-03.11): (%)

Alkali-Silica Reactivity (AASHTO T-303): (% at 14 Days)
(3 Day = 6 Day = 9 Day =)

Result: INFORMATIONAL
Remarks:

Distribution:
Materials File X
Region Construction 4
Project Engineer:
GEOTECH - J. STRUTHERS X(2)

THOMAS E. BAKER, P.E.
MATERIALS ENGINEER
Donald Brouillard
Date: 04/10/2004
Phone: (360) 709-5446

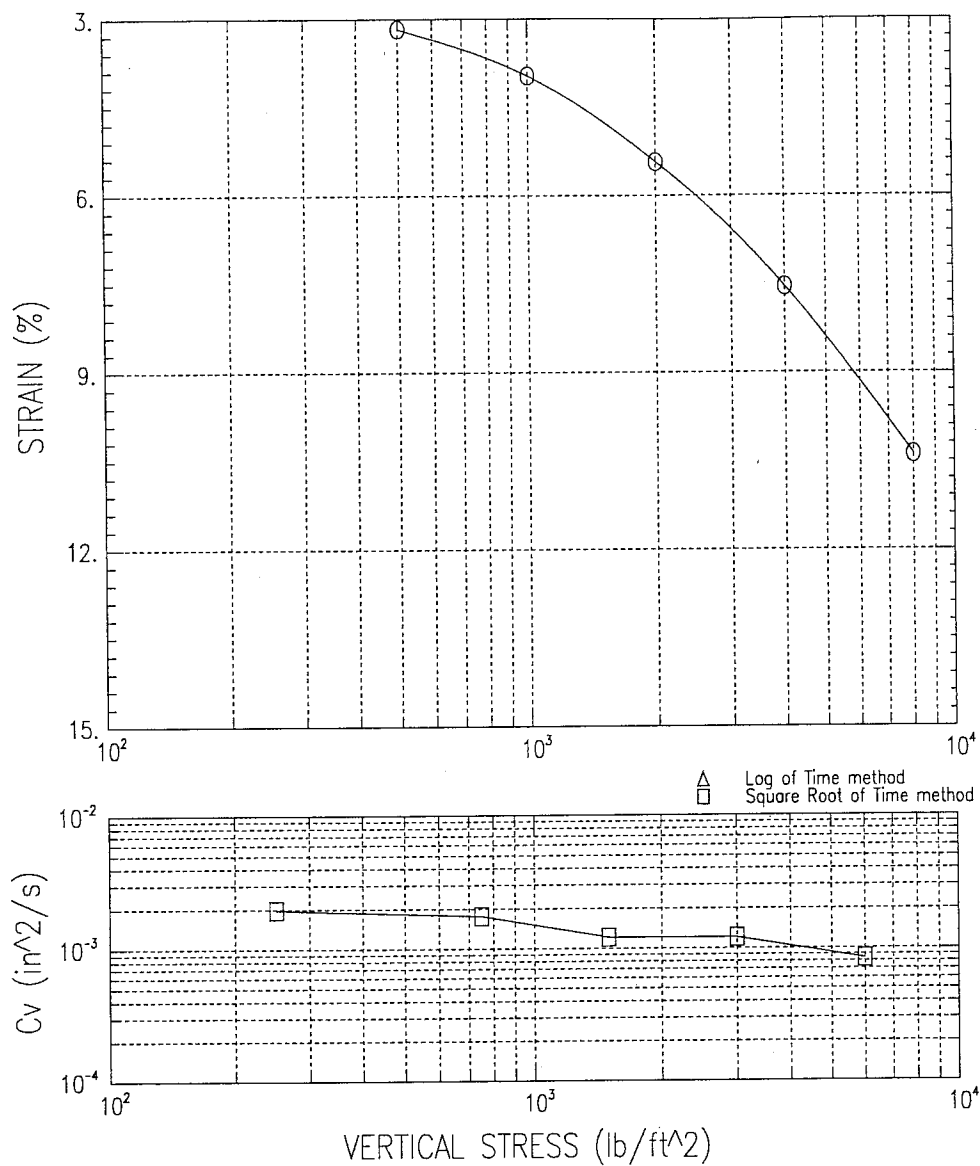
By: *fbk*

T42G- T43L- T44F- T44Q-
T43A-1.0 T43M- T44H-1.0 T44R-
T43B- T44B- T44J- T44U-
T43D-1.0 T44D-1.0 T44L- T45W-
T43H- T44E- T44M-

aggtestp.dfr 3/03

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

Depth : 10.7 FT

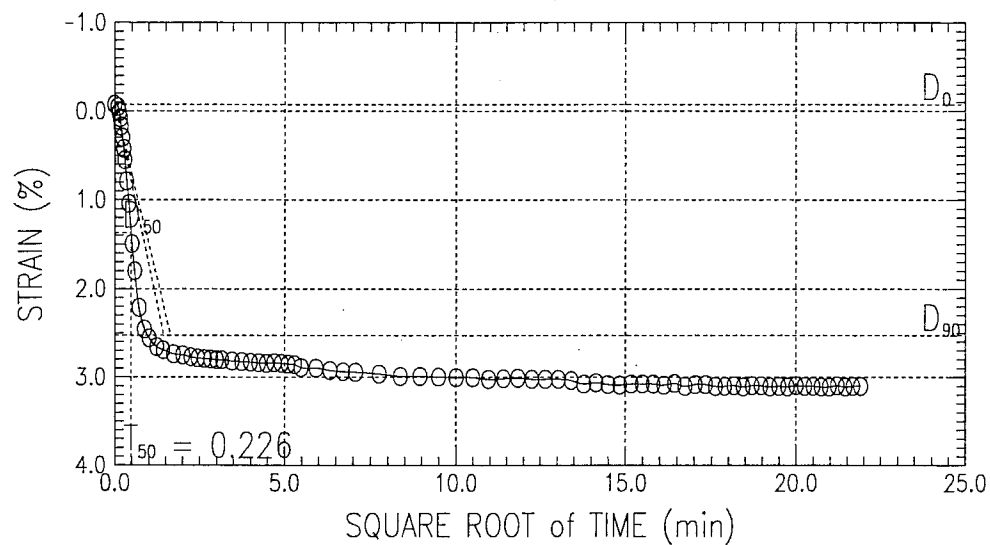
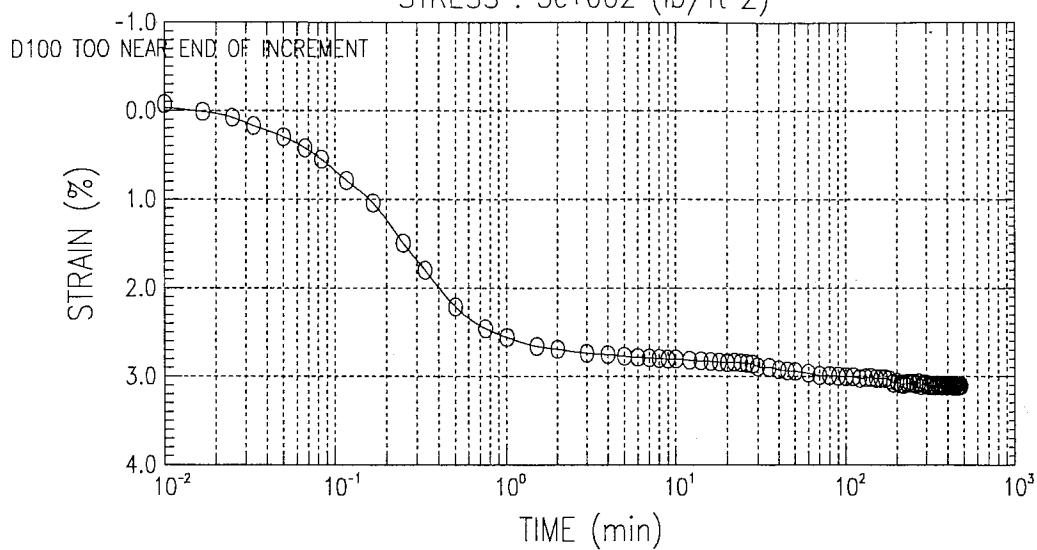
Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 1 OF 5)

STRESS : 5e+002 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

Depth : 10.7 FT

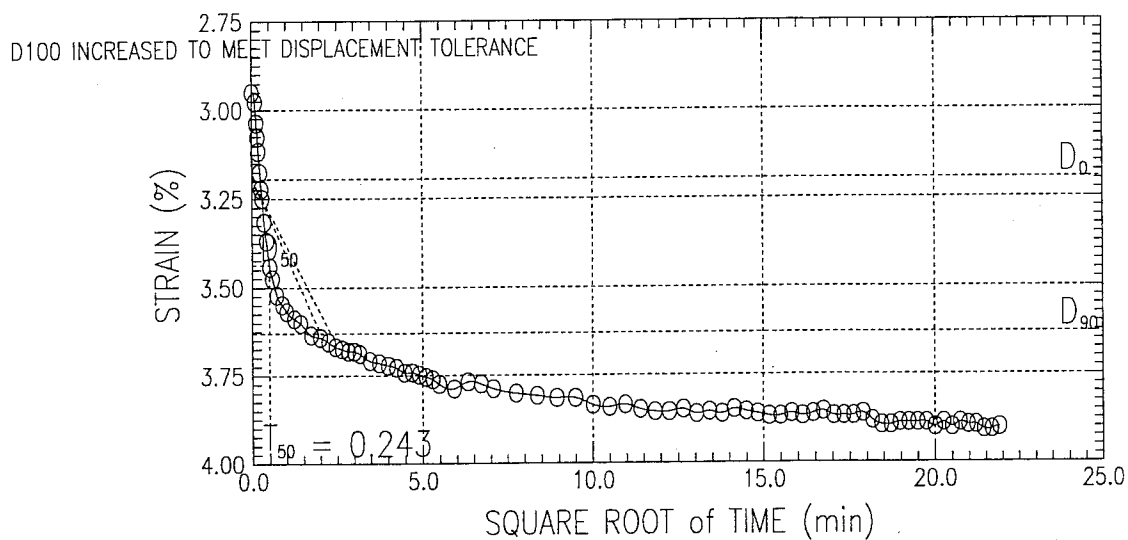
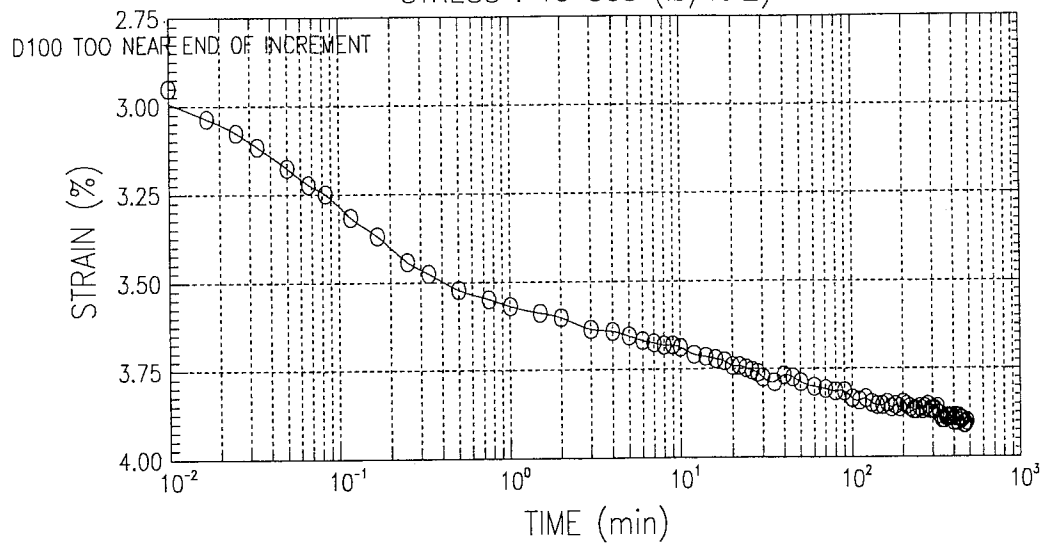
Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 2 OF 5)

STRESS : 1e+003 (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

Depth : 10.7 FT

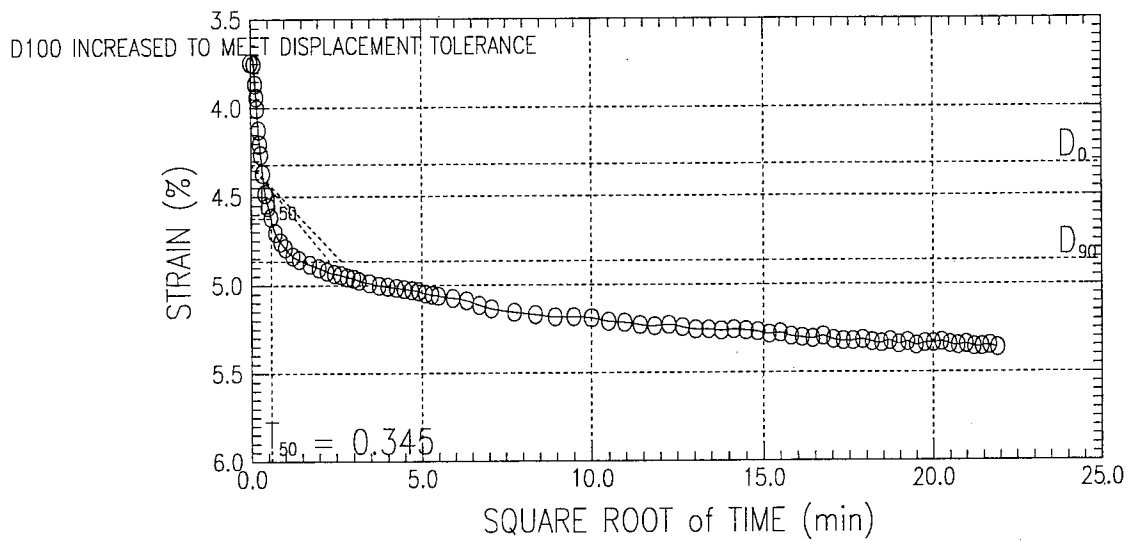
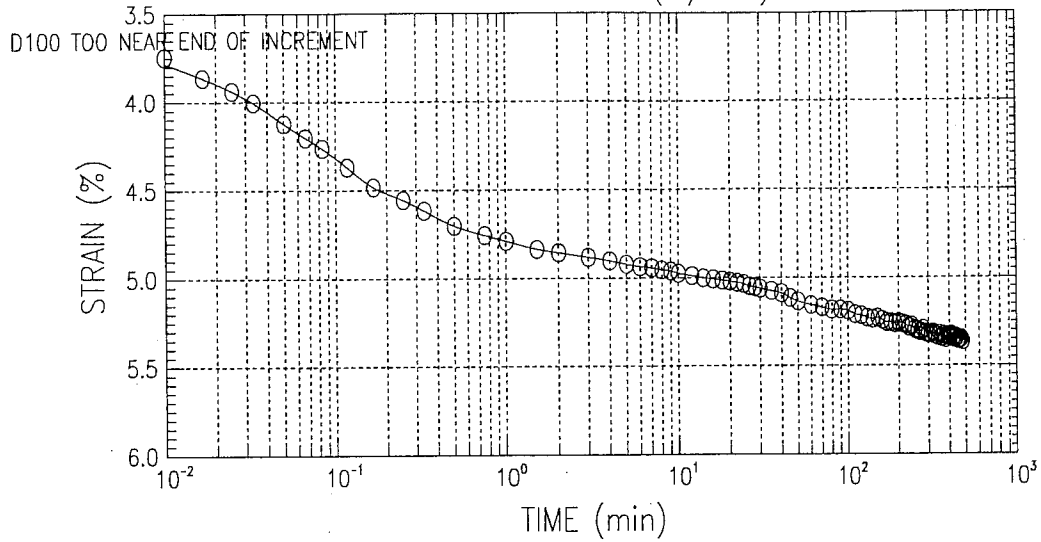
Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 3 OF 5)

STRESS : 2e+003 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

Depth : 10.7 FT

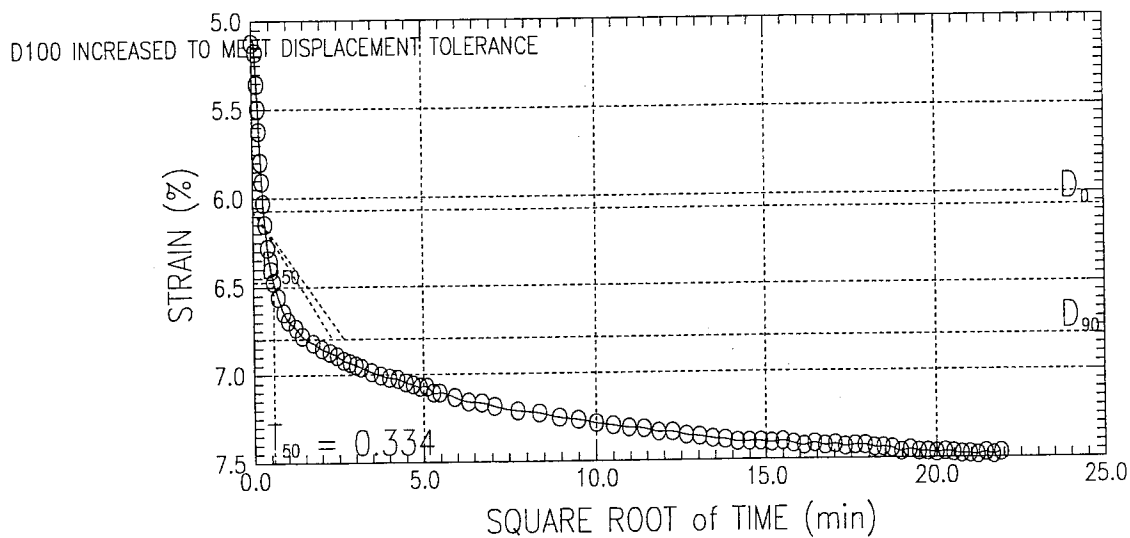
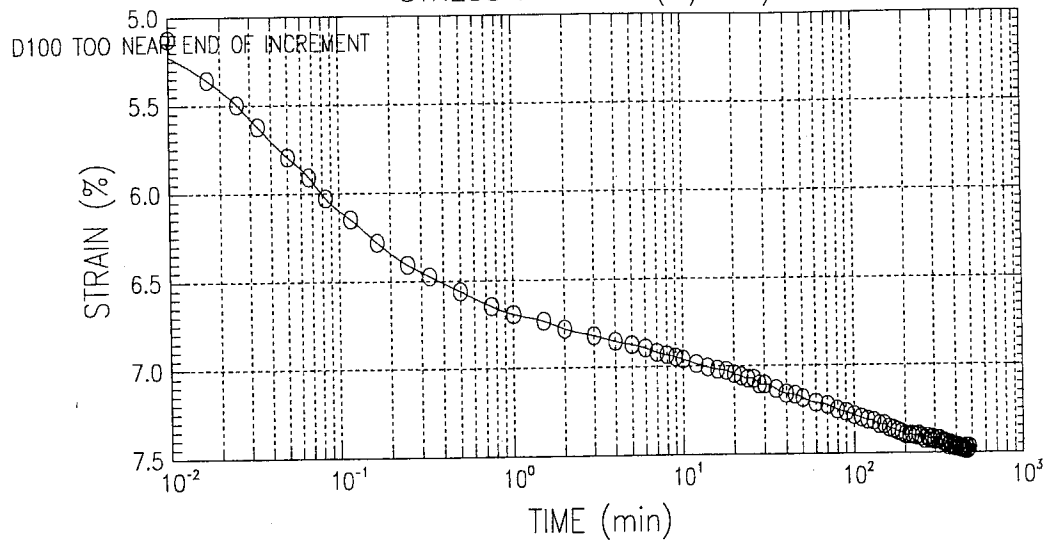
Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 4 OF 5)

STRESS : 4e+003 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

Depth : 10.7 FT

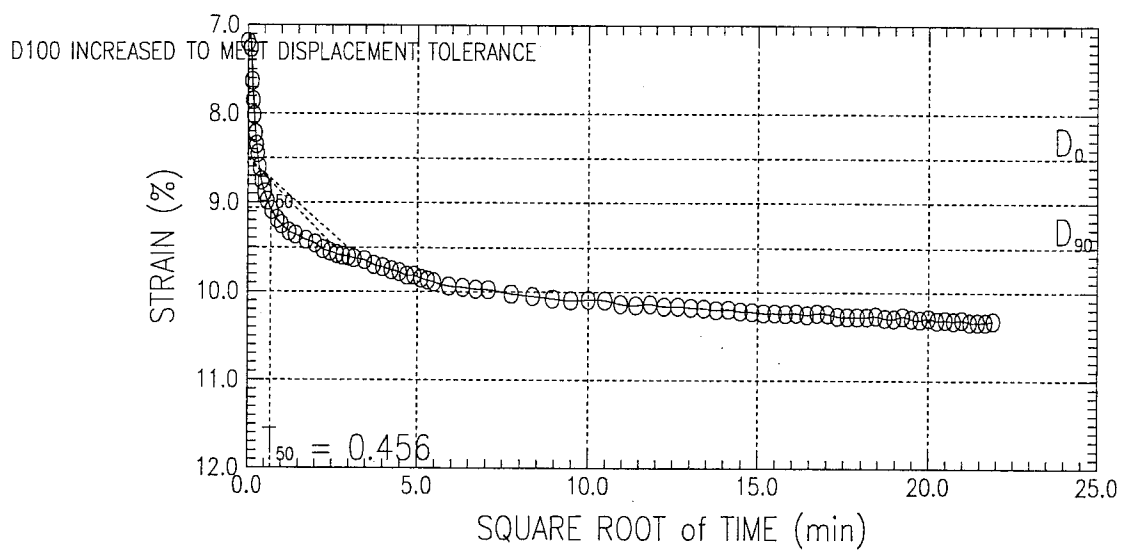
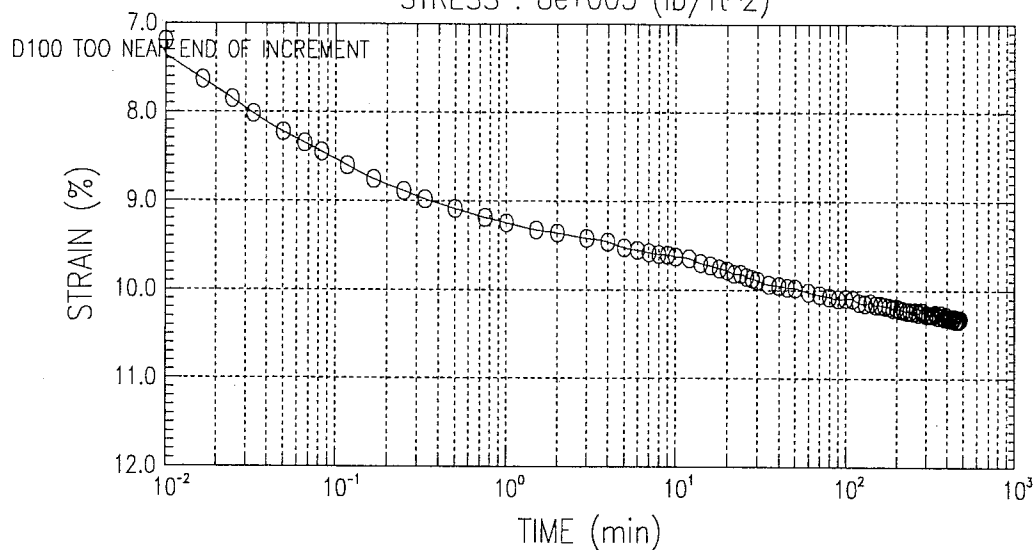
Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 5 OF 5)

STRESS : 8e+003 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-3

Test Date : 3/24/04

Test No : 5196S3C

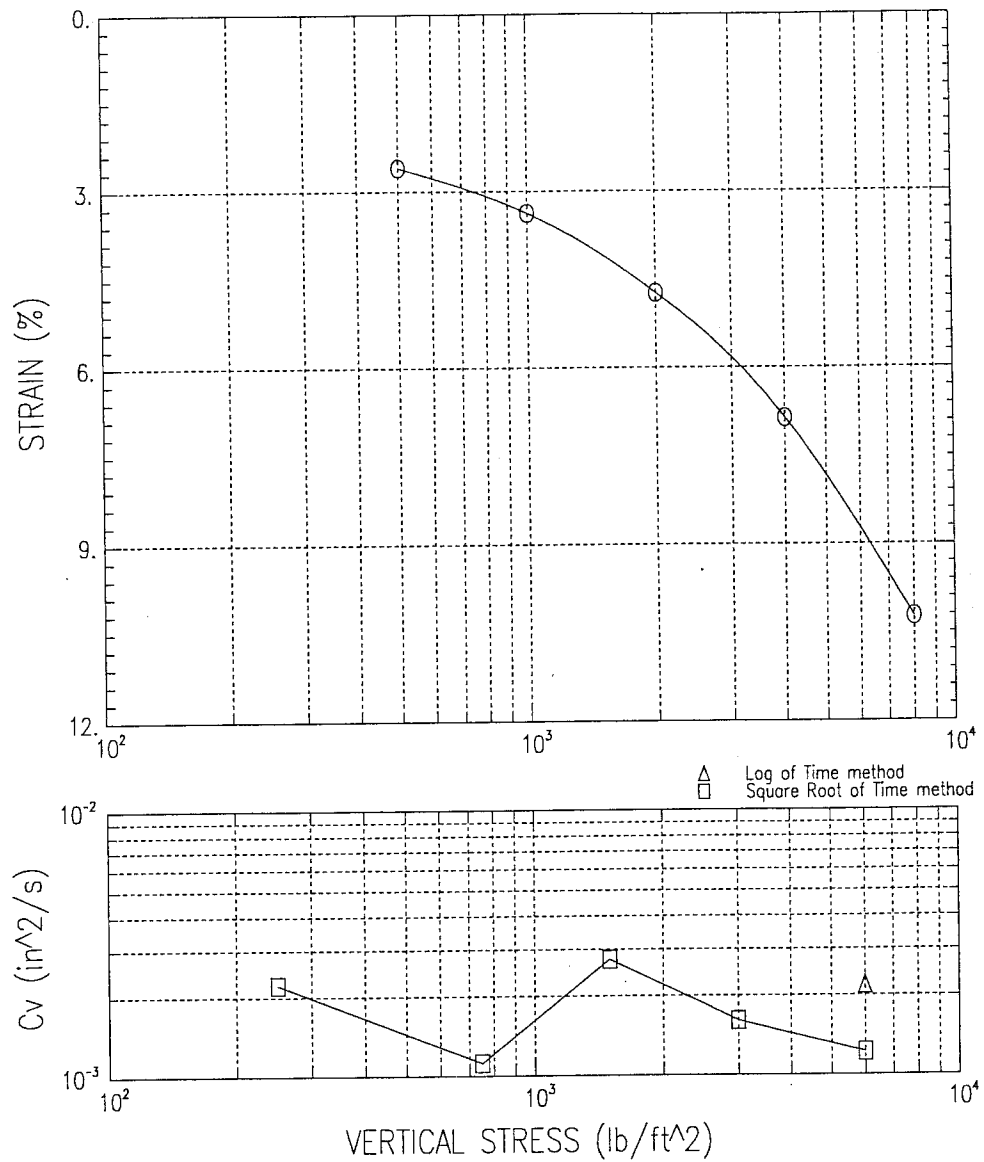
Depth : 10.7 FT

Description : MOIST GRAY SILT

Remarks :

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

Depth : 10.6 FT

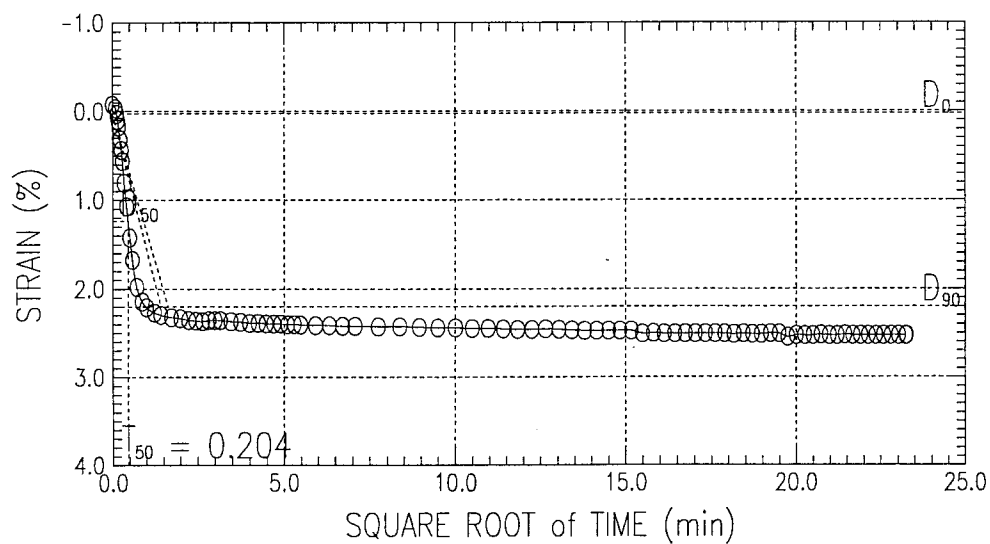
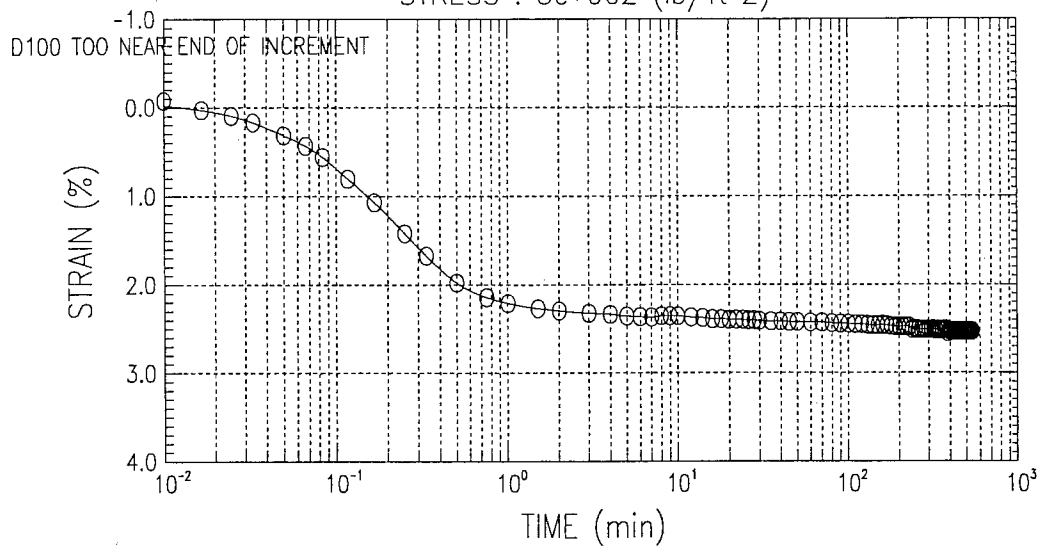
Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 1 OF 5)

STRESS : 5e+002 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

Depth : 10.6 FT

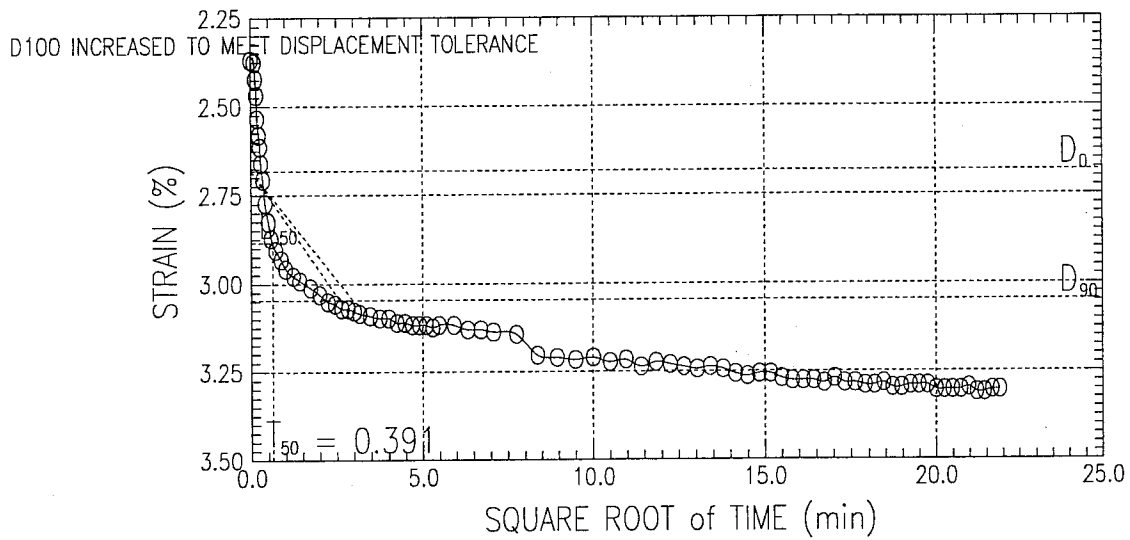
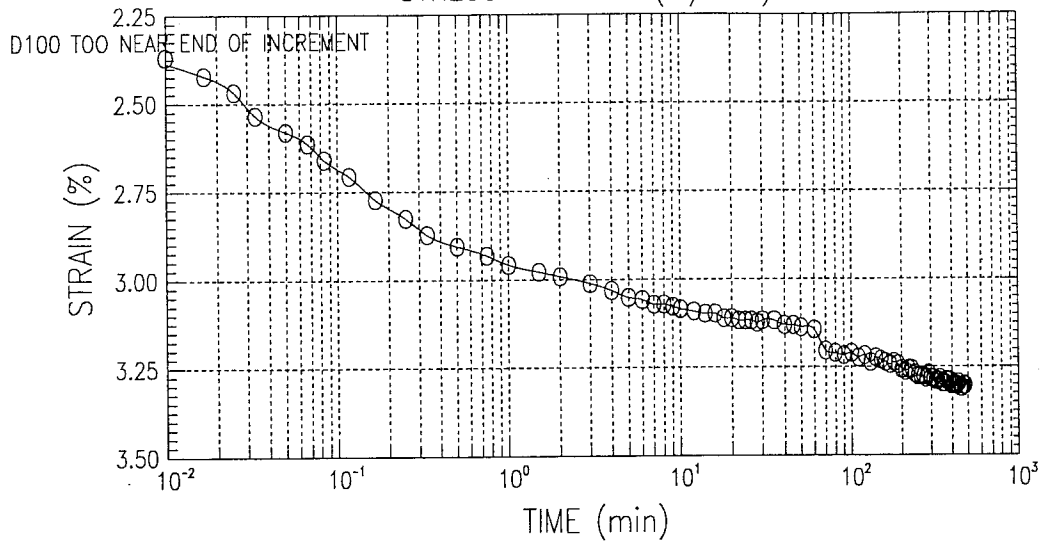
Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 2 OF 5)

STRESS : 1e+003 (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

Depth : 10.6 FT

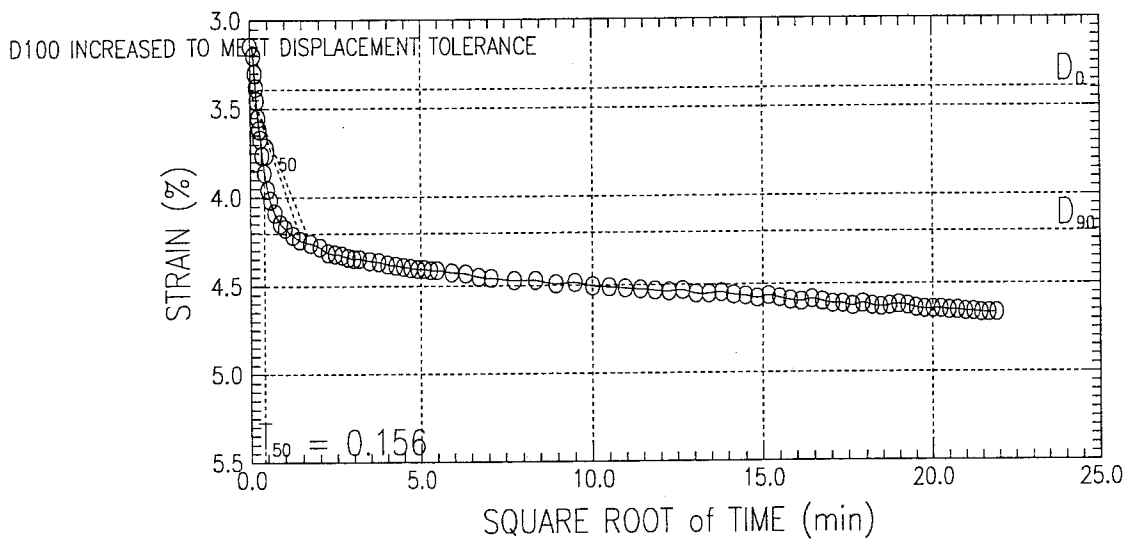
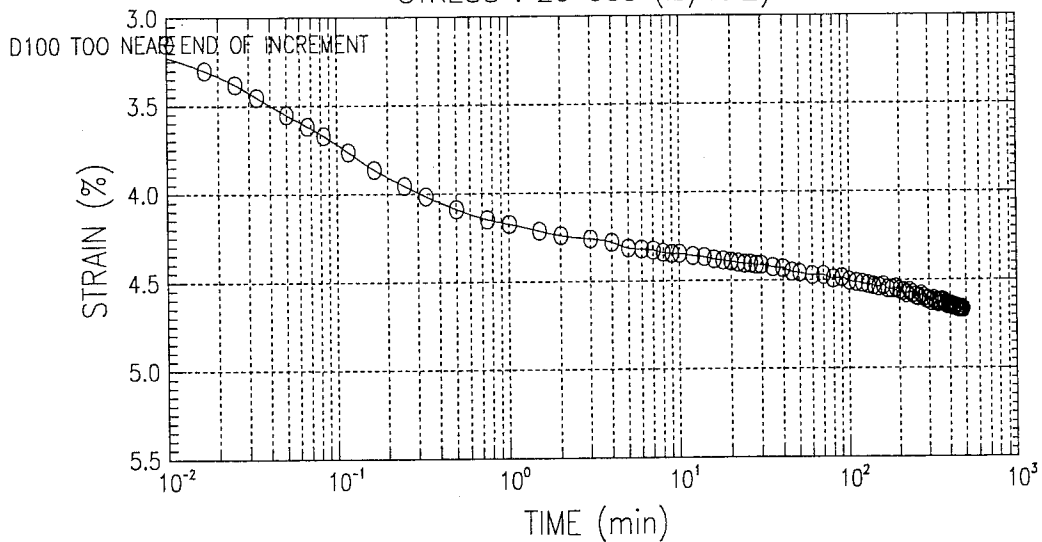
Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 3 OF 5)

STRESS : $2e+003$ (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

Depth : 10.6 FT

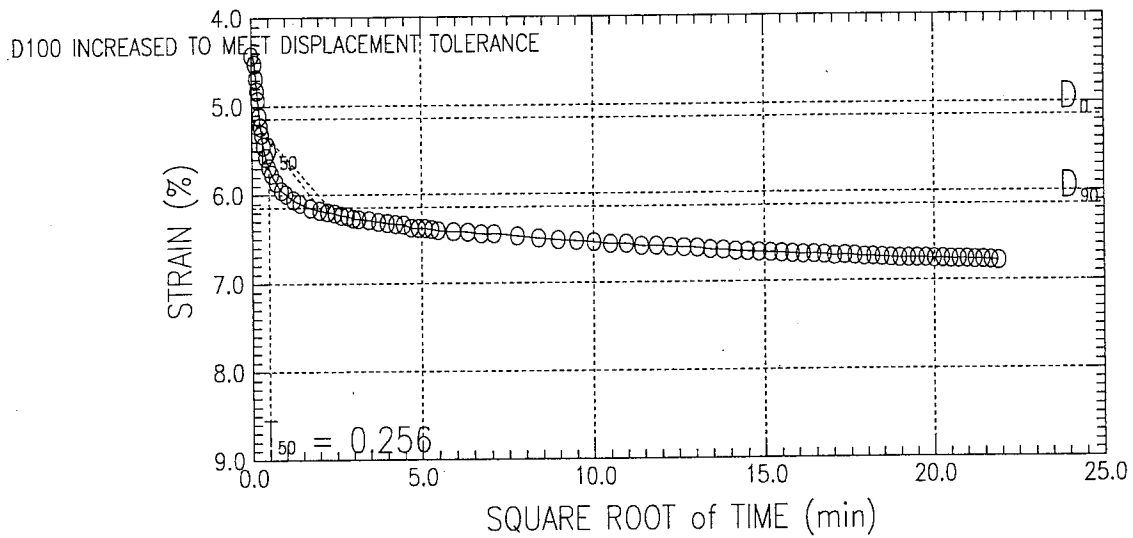
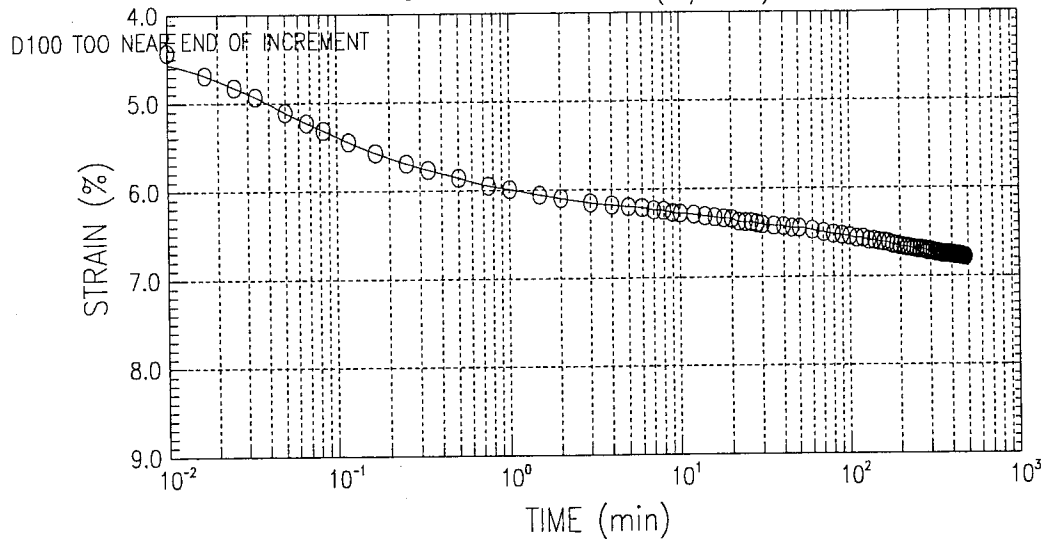
Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 4 OF 5)

STRESS : $4e+003$ (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

Depth : 10.6 FT

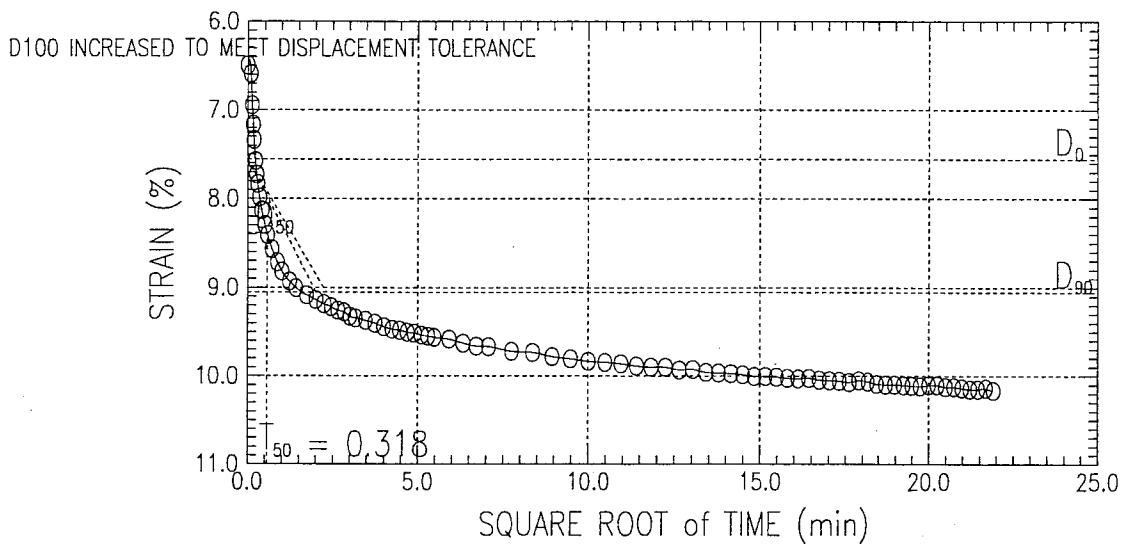
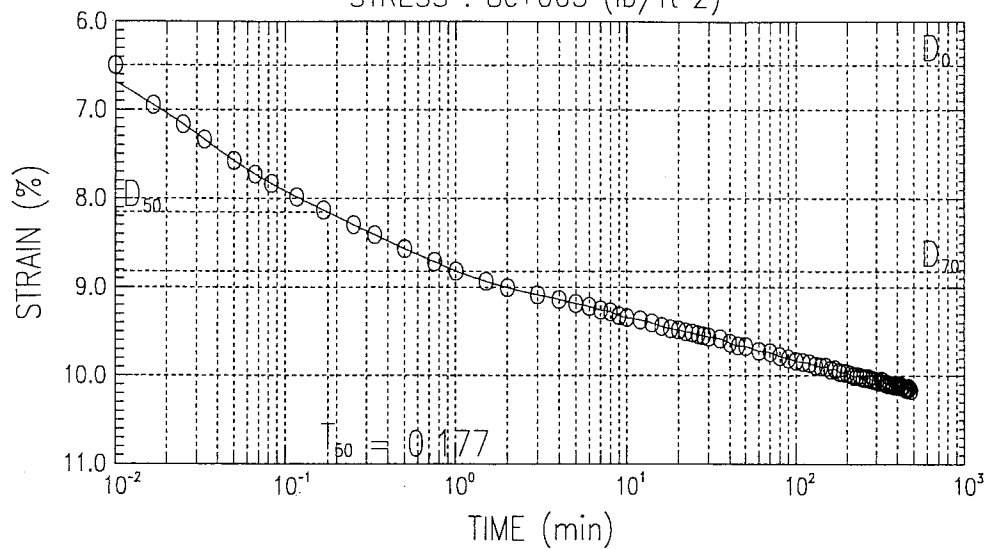
Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 5 OF 5)

STRESS : 8e+003 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-42-04

Sample No : S-3

Test Date : 4/5/04

Test No : 5147S3C

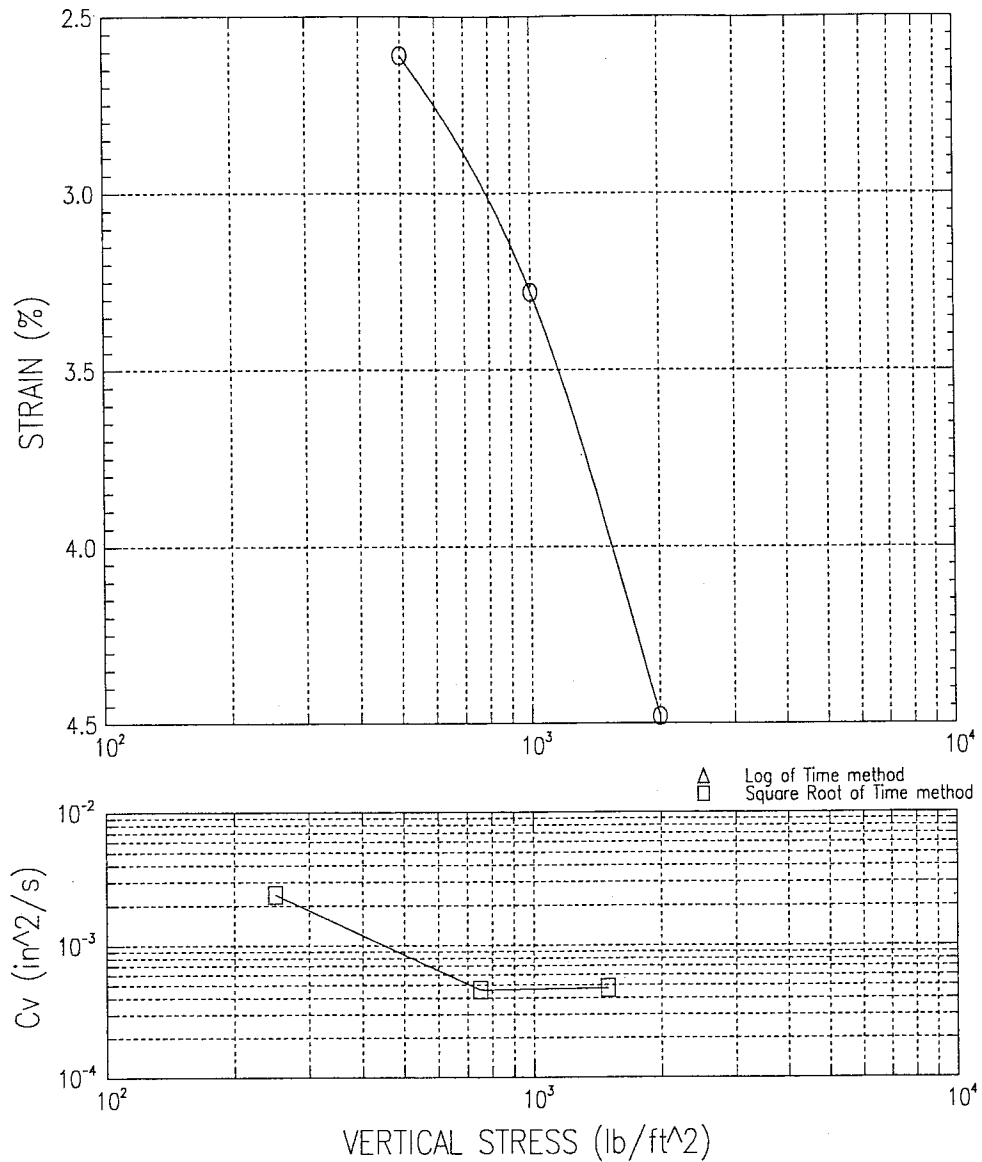
Depth : 10.6 FT

Description : MOIST DARK OLIVE GRAY SILT

Remarks :

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-43-04

Sample No : S-1

Test Date : 4/8/04

Test No : 5160S1C

Depth : 5.2 FT

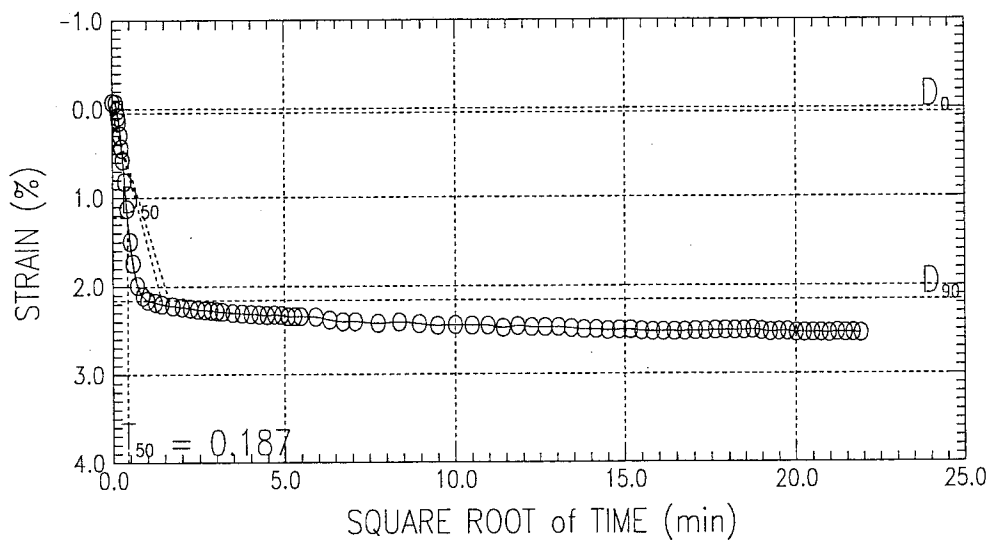
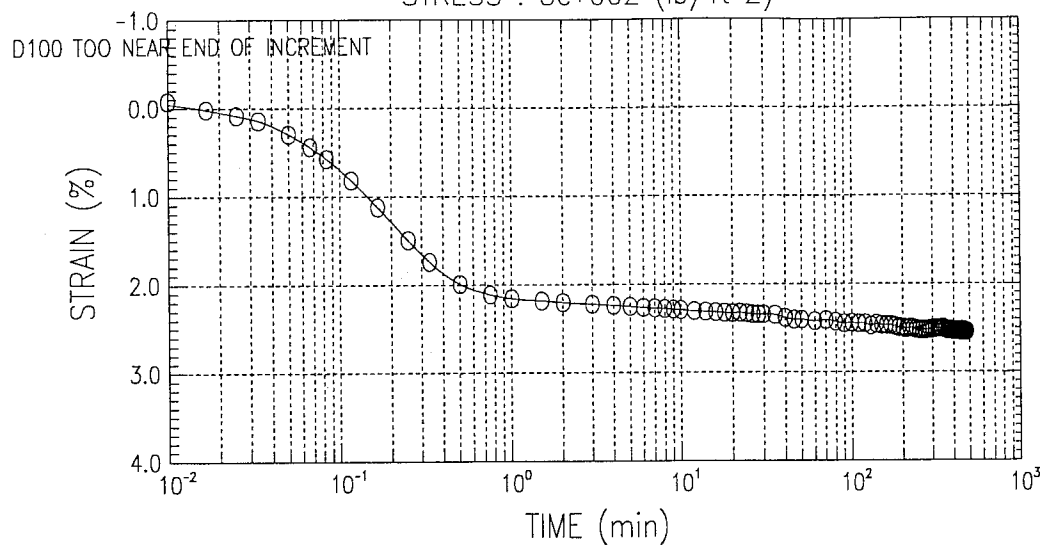
Description : MOIST DARK GRAYISH BROWN

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 1 OF 3)

STRESS : 5e+002 (lb/ft^2)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-43-04

Sample No : S-1

Test Date : 4/8/04

Test No : 5160S1C

Depth : 5.2 FT

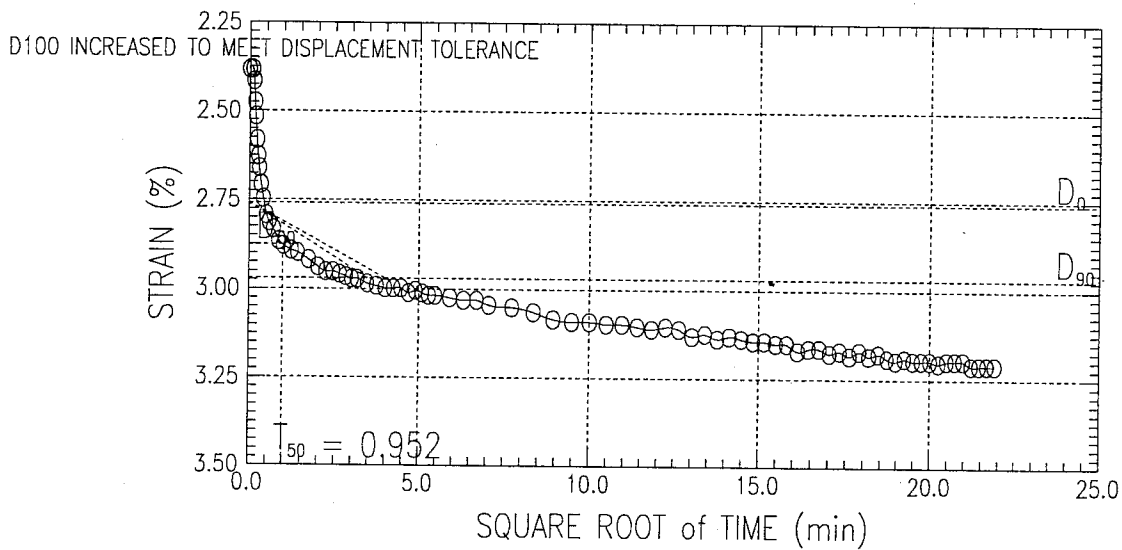
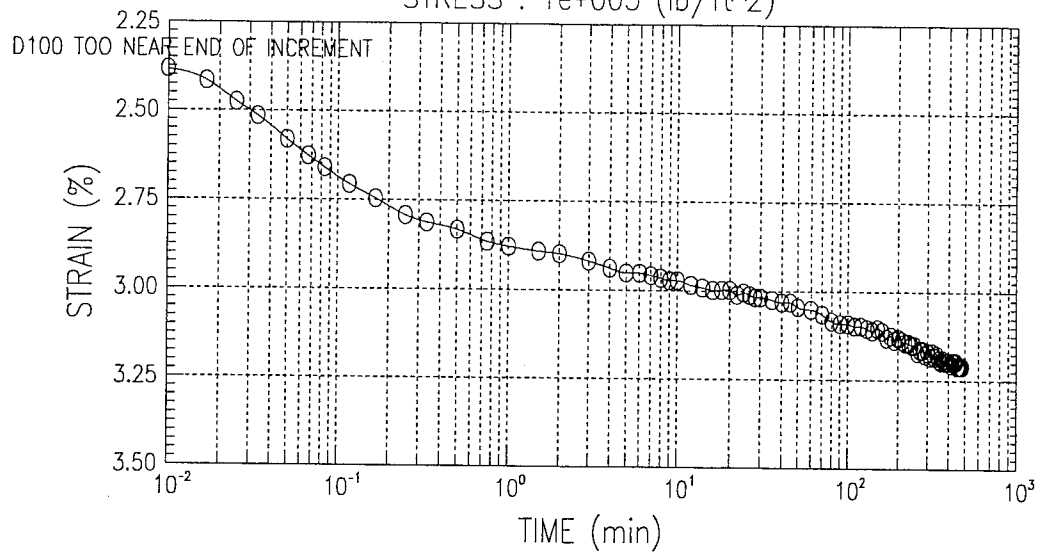
Description : MOIST DARK GRAYISH BROWN

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 2 OF 3)

STRESS : 1e+003 (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-43-04

Sample No : S-1

Test Date : 4/8/04

Test No : 5160S1C

Depth : 5.2 FT

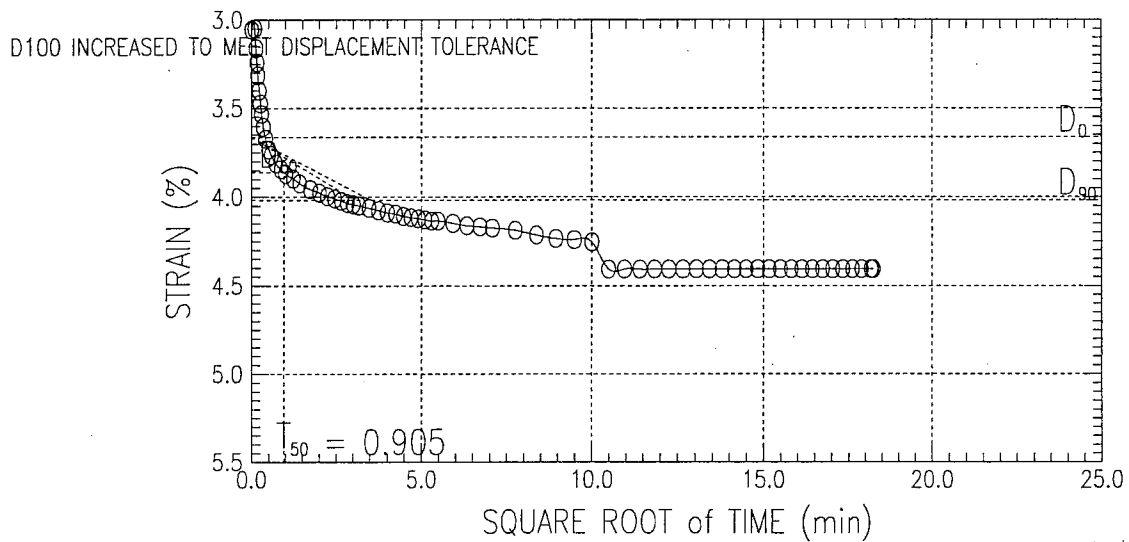
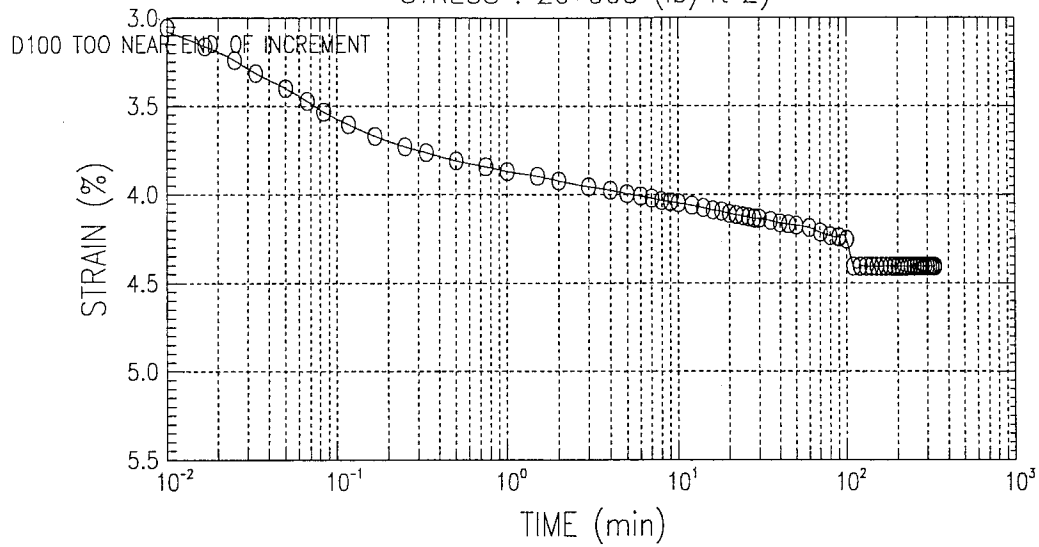
Description : MOIST DARK GRAYISH BROWN

Remarks :

CONSOLIDATION TEST

TIME CURVES (STEP 3 OF 3)

STRESS : $2e+003$ (lb/ft²)



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : XL-3502

Boring No : H-43-04

Sample No : S-1

Test Date : 4/8/04

Test No : 5160S1C

Depth : 5.2 FT

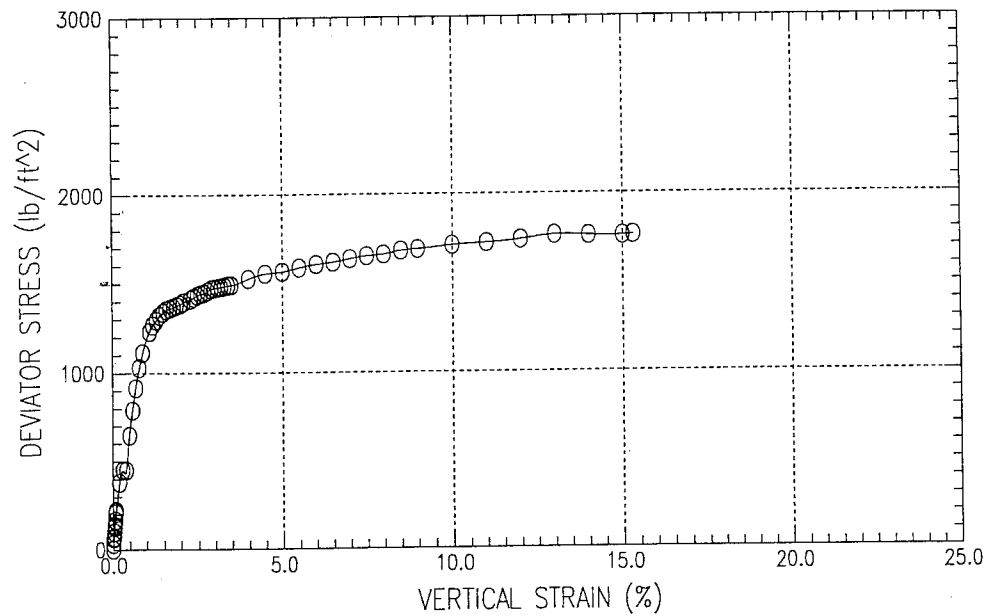
Description : MOIST DARK GRAYISH BROWN

Remarks :

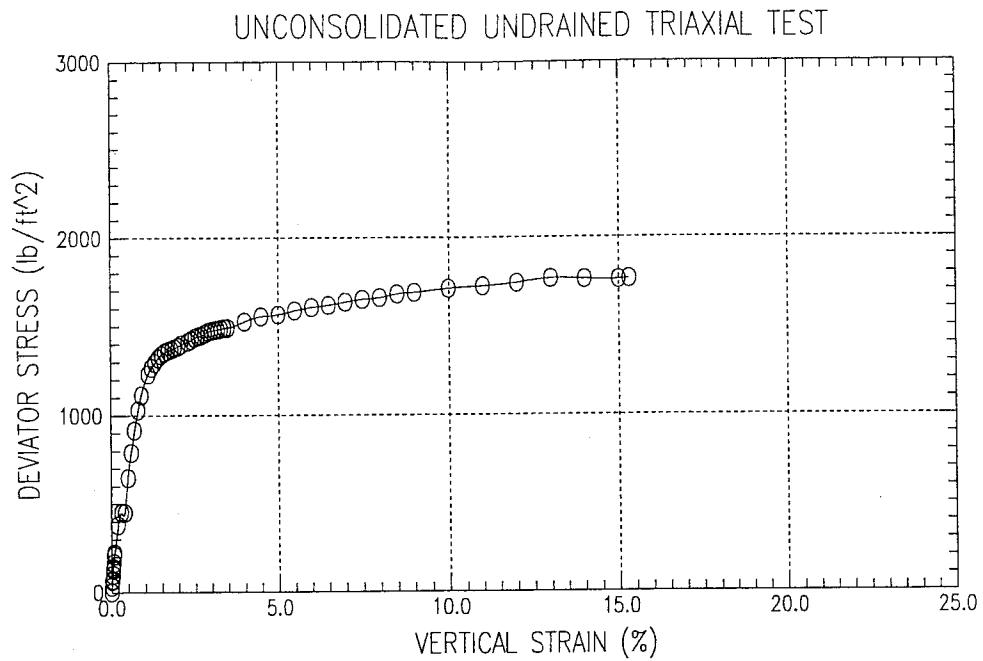
$c = 0.0 \text{ (lb/ft}^2\text{)}$
 $\phi = 27.8$
 $\tan \phi = 0.53$

SHEAR STRESS, $q \text{ (lb/ft}^2\text{)}$

TOTAL STRESS, $p \text{ (lb/ft}^2\text{)}$



Remarks :



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-8-04

Sample No : SH-4

Test Date : 4/6/04

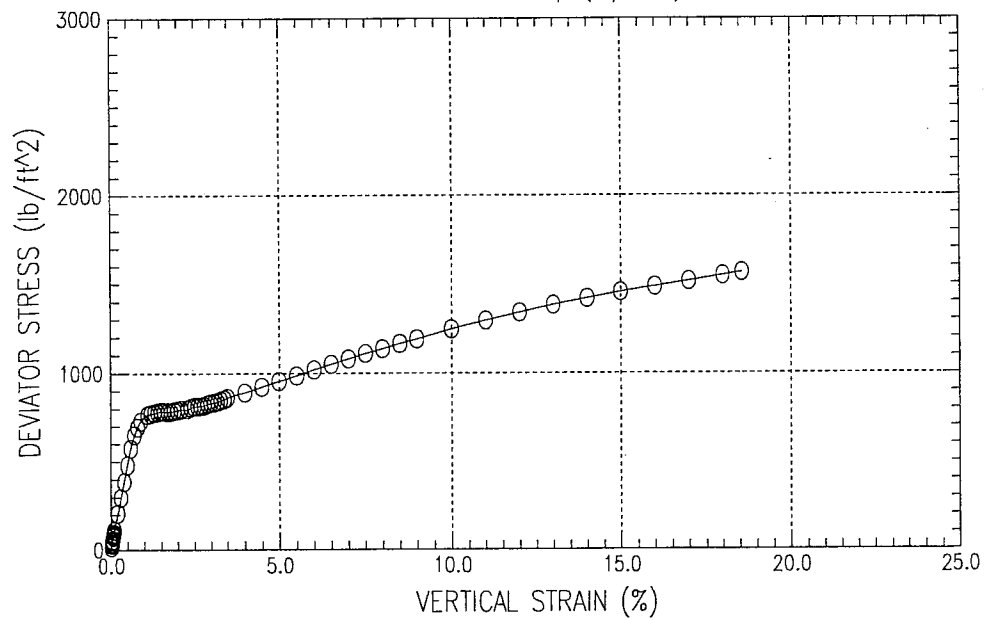
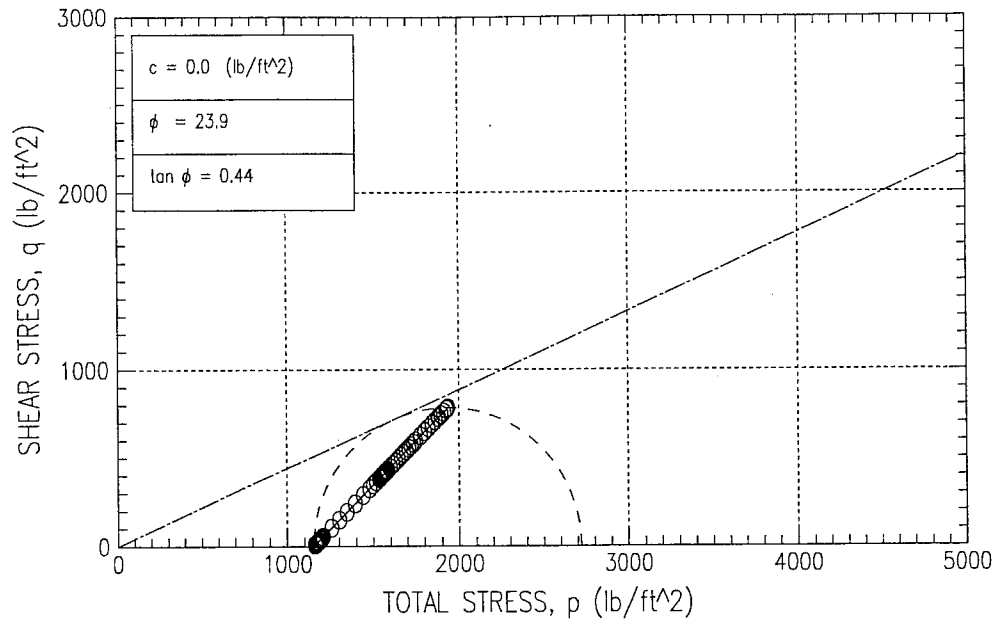
Test No : 5138S4U

Depth : 8.6 FT

Description : MOIST BROWN SILT

Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-16-04

Sample No : S-2

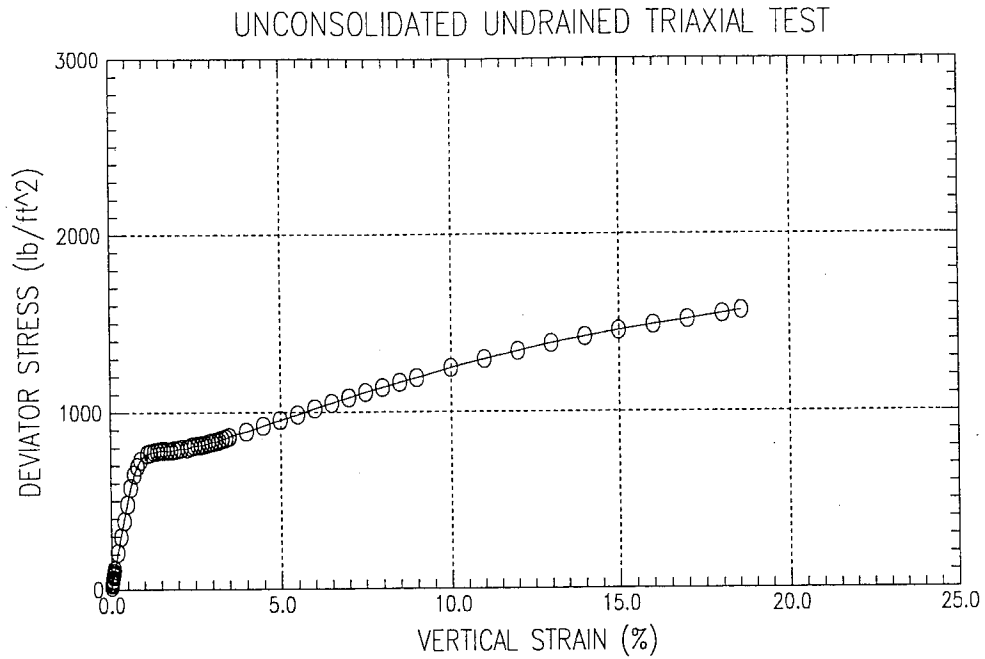
Test Date : 4/6/04

Test No : 5169S2U

Depth : 10.6 FT

Description : MOIST DARK OLIVE GRAY SILT

Remarks :



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-16-04

Sample No : S-2

Test Date : 4/6/04

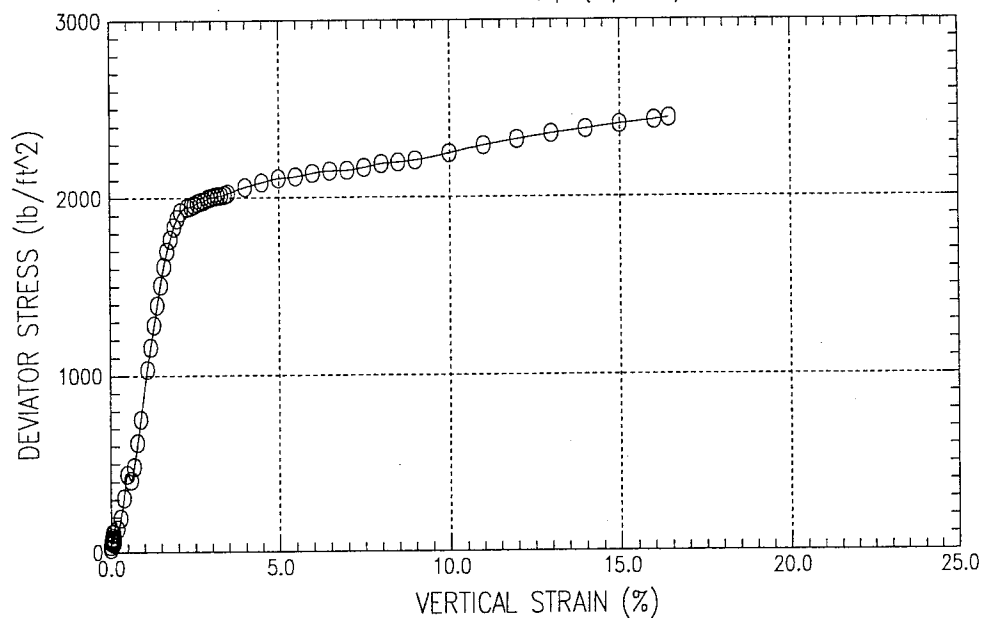
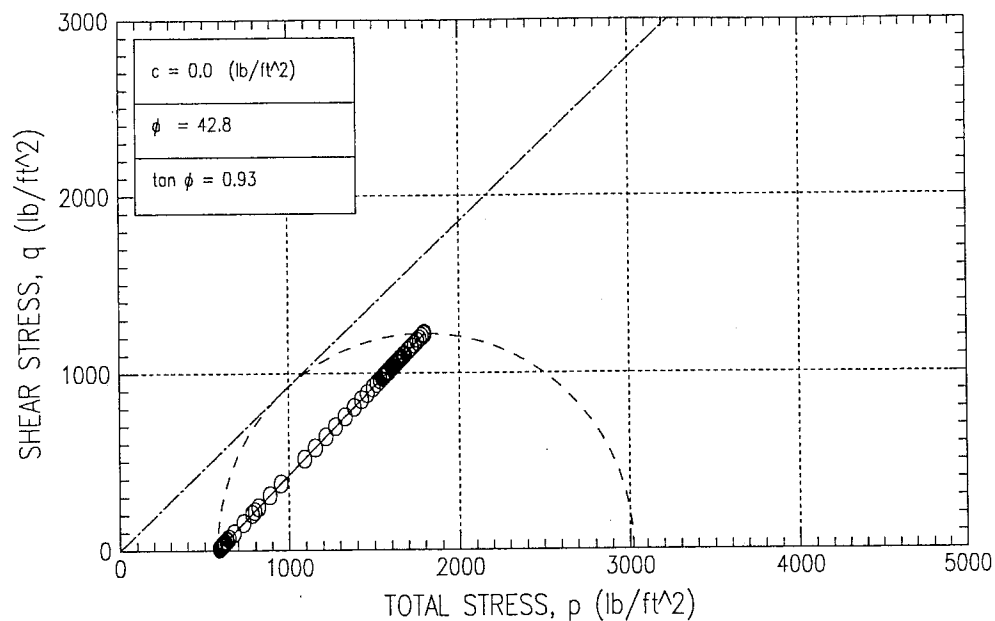
Test No : 5169S2U

Depth : 10.6 FT

Description : MOIST DARK OLIVE GRAY SILT

Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-1

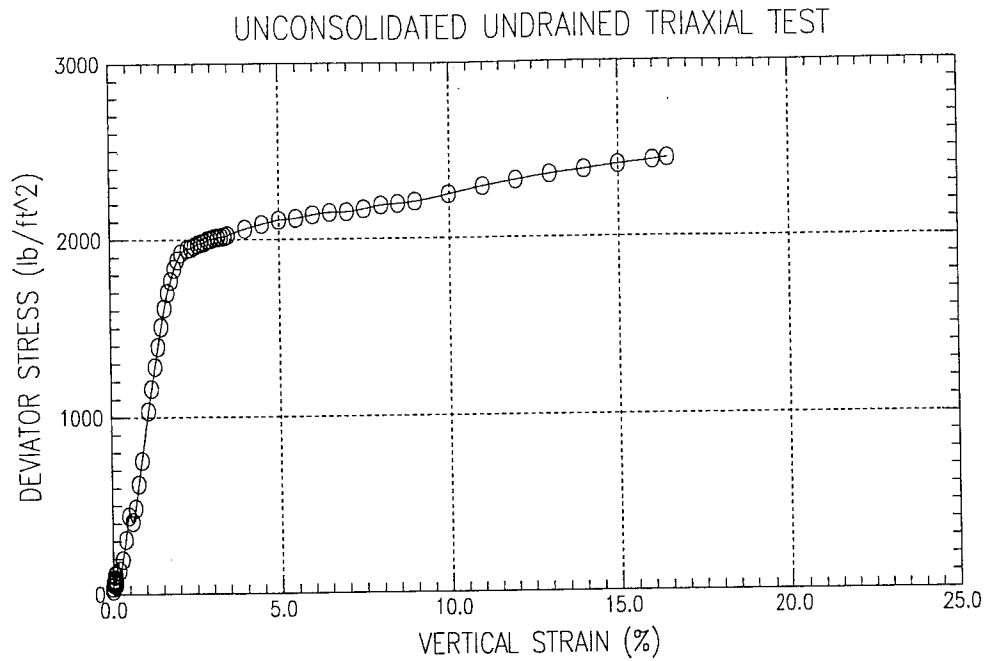
Test Date : 4/7/04

Test No : 5196S1U

Depth : 5.5 FT

Description :

Remarks :



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-38-04

Sample No : S-1

Test Date : 4/7/04

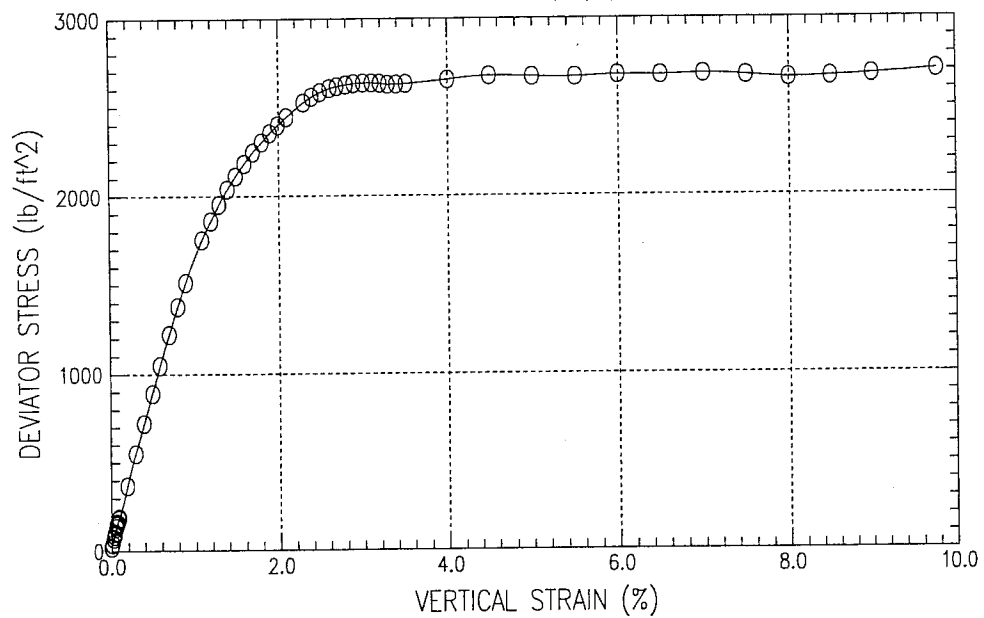
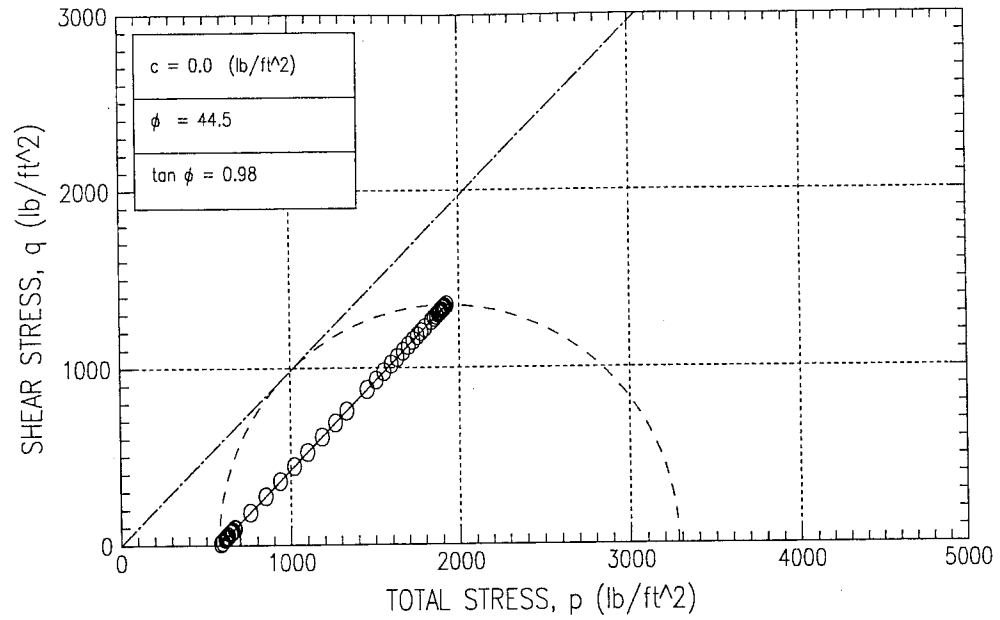
Test No : 5196S1U

Depth : 5.5 FT

Description :

Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-43-04

Sample No : S-1

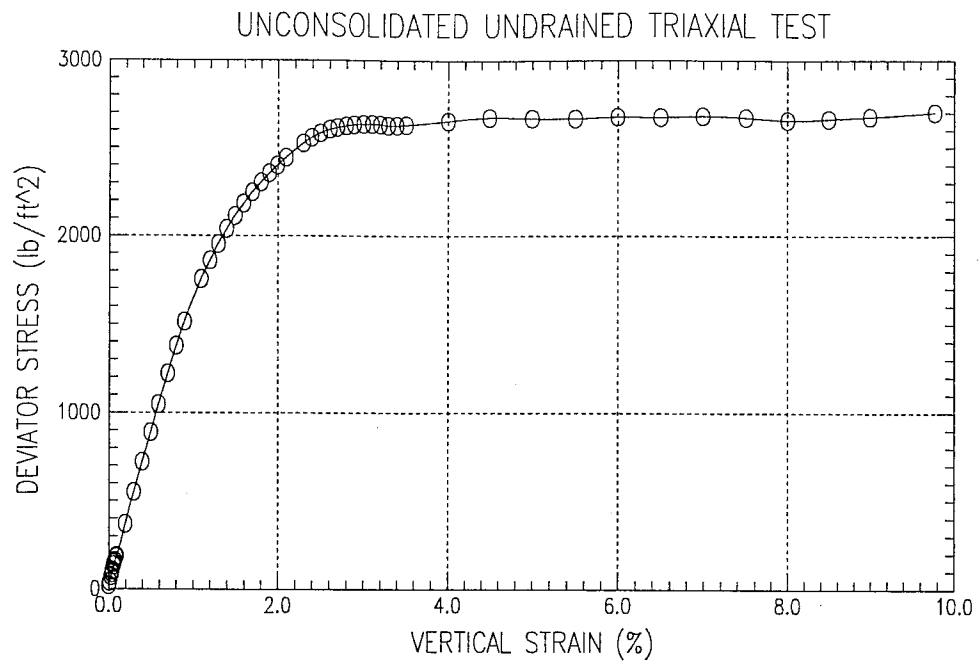
Test Date : 4/7/04

Test No : 5160S1U

Depth : 5.6 FT

Description :

Remarks :



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-43-04

Sample No : S-1

Test Date : 4/7/04

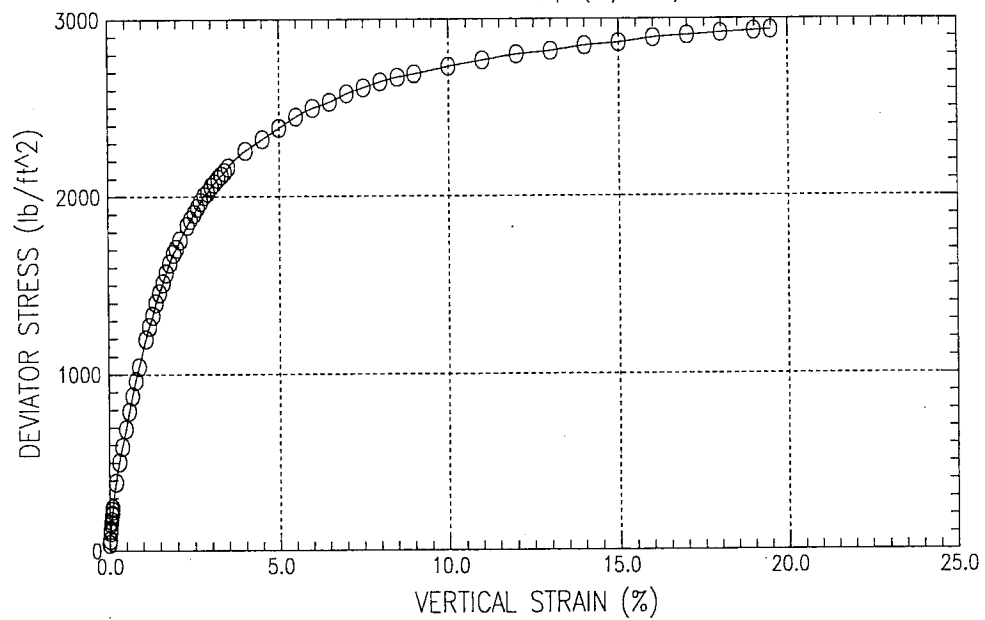
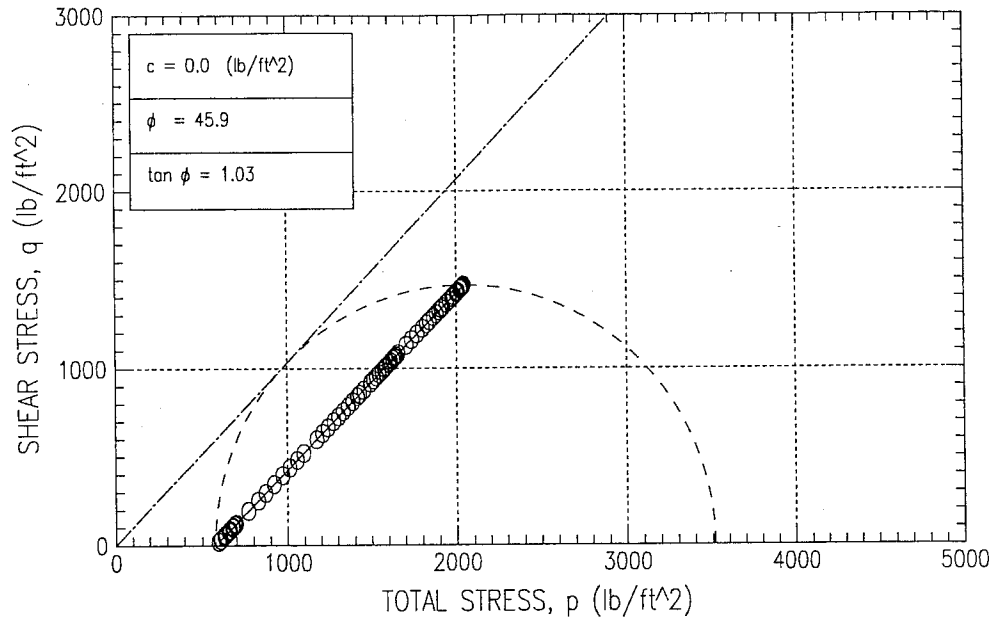
Test No : 5160S1U

Depth : 5.6 FT

Description :

Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-44-04

Sample No : U-1/D

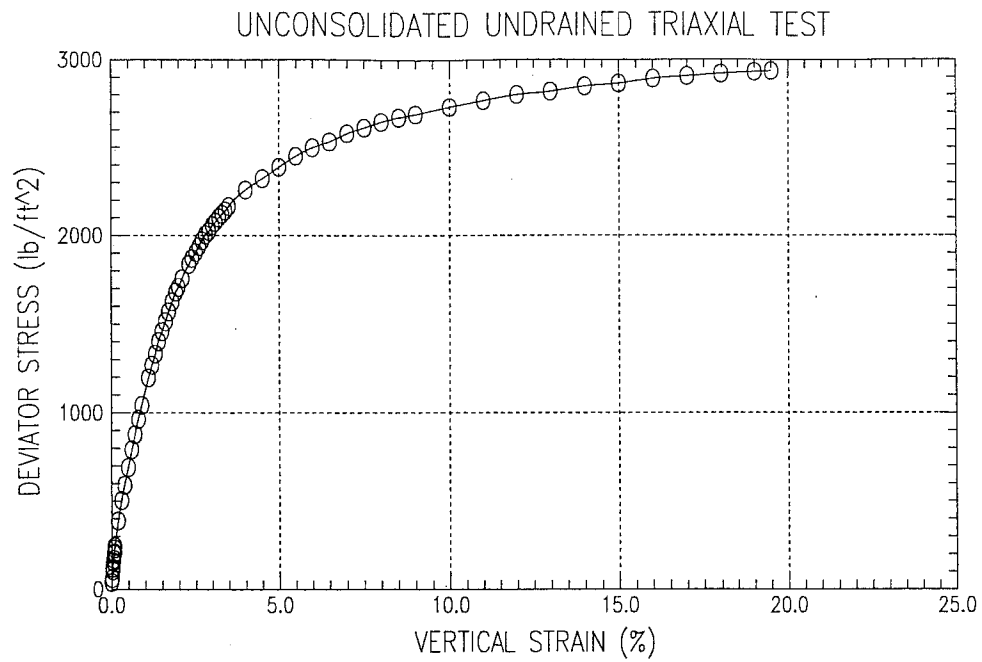
Test Date : 3/25/04

Test No : 5126U1D

Depth : 5.2 FT

Description : WET DARK GRAY SILT

Remarks :



Washington State D.O.T.

Project Name : PULLMAN TO IDAHO ST LINE

Project No : OL-3502

Boring No : H-44-04

Sample No : U-1/D

Test Date : 3/25/04

Test No : 5126U1D

Depth : 5.2 FT

Description : WET DARK GRAY SILT

Remarks :

Appendix C

Geophysical Survey Report



**Results of the Seismic Refraction Survey Along
SR 270 from Pullman, WA to Moscow, ID**

Prepared for:
WSDOT

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498



December 6, 2001

Our ref: 013-1655.000

WSDOT
1655 South Second,
Tumwater, Washington 98512-6951

ATTENTION: Mr. James Struthers

RE: RESULTS OF THE SEISMIC REFRACTION SURVEY ALONG SR270 FROM
PULLMAN, WASHINGTON TO MOSCOW, IDAHO

Dear Mr. Struthers:

This letter report presents the results of a geophysical study conducted by Golder Associates Inc. along SR270 from Pullman, Washington to Moscow, Idaho from October 13th to 19th, 2001. The seismic refraction survey was conducted along 14 transects (SL1 through SL12, SL14 and SL15) to determine the depths to relatively competent bedrock (Figure 1a and 1b). The total line coverage was 5590 feet.

INSTRUMENTATION AND FIELD PROCEDURES

The seismic refraction survey was conducted using a Geometrics Strataview 24-channel digital seismograph. The sensors were Mark Products 14-Hz vertical geophones and the seismic energy source was Kinestick explosives.

The refraction method uses seismic waves introduced into the ground by an explosive or weight-drop source. As the seismic wave propagates through the earth the materials through which it passes change its direction and speed (refraction). When the seismic wave impinges on an interface at critical incident angle, the energy travels along the interface generating seismic wavelets that are refracted to the ground surface. Geophones placed at selected intervals along the ground surface detect the refracted arrivals and produce an electrical signal that is sent via a cable, to the seismograph. The seismograph digitizes, amplifies, filters, and records the incoming signals. Analysis of the arrival times of the refracted wave provides a means for modeling the seismic velocity and depths to subsurface layers and classifying the type of material based on the velocity.

Field procedure consisted of laying out the cables, planting the geophones, and setting up three middle shots, two near end shots and two off-end shots. Data were collected and saved in digital format and also printed on paper.

ANALYSIS AND DATA PROCESSING

For each shot the first seismic arrivals on each channel were carefully picked. The first arrival times were then plotted against distance (time-distance plot) for each line. These plots were used to determine the number of subsurface interfaces, two-way travel times to the interfaces under each geophone, and the velocity of the materials. This information was then used to develop the depth sections and velocity profiles for each transect. The following summarizes the results of the analysis, which are also presented on figures located in the appendix (Figures 2-15).

The coordinates and elevations from surveyors for geophones on SL8 together with borehole H-07-01 location were wrong. The location of the line in this report was estimated based on the proposed borehole location and its reference to the geophone locations from field notes, and the elevations of geophones on this line were taken from the topographic map.

RESULTS

Based on borehole logs in the survey area (H-1-1 through H-10-1), the basalt bedrock is overlain with loess and no ground water was encountered. The results of the seismic refraction survey are summarized in Table 1 and on Figures 1-15.

The bedrock velocity varies from approximately 7030 ft/s to 17900 ft/s and ranges in depth from approximately 2 feet to 95 feet. The range in compressional velocity is interpreted to be a function of the degree of weathering or fracturing

LIMITATIONS

Golder Associates Inc. uses the due standard of care recognized in the industry for geophysical investigations. The information in this report is based on geophysical measurements obtained by generally accepted methods and procedures and our interpretation of the data. Individual values may in some instances, be in error due to soil and rock or poor signal to noise conditions. In general, the errors in the interpreted depths related to the resolution of the technique is about $\pm 15\%$ of the true depths.

CLOSURE

We appreciate the opportunity to work with you on this project. If you have any questions regarding this report please contact the undersigned at (425) 883-0777.

Sincerely,

GOLDER ASSOCIATES, INC.



John Liu, Ph.D.
Project Geophysicist



Dick Sylwester
Associate Geophysicist

JL/RES/ms
1206jl1

TABLE

TABLE 1

Results of the Seismic Refraction Survey

LINE	VELOCITY (FT/SEC.)	INTERPRETED GEOLOGY	LAYER THICKNESS OR DEPTH TO BEDROCK (FT)
SL1	1750	loess	6-50
	5900	wet/saturated loess?	34-48
	17930	bedrock	50-93
SL2	1750	loess	11-34
	5700	wet/saturated loess?	25-33
	17930	bedrock	41-67
SL3	1200	silt	3-13
	3200	stiff lean clay?	0.5-10
	10300	bedrock	3-23
SL4	1200	silt/soft lean clay	8-21
	3200	stiff lean clay	4-6
	13530	bedrock	12-27
SL5	630	organic soil	0.6-1.5
	9565	bedrock	0.6-1.5
SL6	1000	silt/soft lean clay	3-9
	3120	lean clay with gravel/highly weathered rock	9-28
	9900/13750/9900	bedrock	14-36
SL7	1000	silt/soft lean clay	3-9
	4400	lean clay with gravel/highly weathered rock?	6-14
	15000/11000/22000/17870	bedrock	7-21
SL8	1000/1320	silt/soft lean clay	11-25
	3200	stiff lean clay	5-21
	17000	bedrock	15-46
SL9	1000/1320	silt/soft lean clay	10-20
	3200	stiff lean clay	14-35
	18250	bedrock	26-54
SL10	1000/1480	silt/soft lean clay	15-22
	3200	stiff lean clay	28-43
	19000	bedrock	42-64
SL11	1000/1160	silt/soft lean clay	3-18
	4600	stiff lean clay(wet?)	11-28
	13940	bedrock	18-43
SL12	1000	silt/soft lean clay	2-3
	1250	soft lean clay (thin stiff clay may exist)	0.1-8
	13620	bedrock	2-11
SL14	1000/1500	silt/soft lean clay	17-27
	3500	stiff lean clay	8-11
	7560/10000	bedrock	24.6-32.5
SL15	1000/1500	silt/soft lean clay	1.5-30
	3500	stiff lean clay	0.5-16
	10200/7030/7550	bedrock	2-44

FIGURES

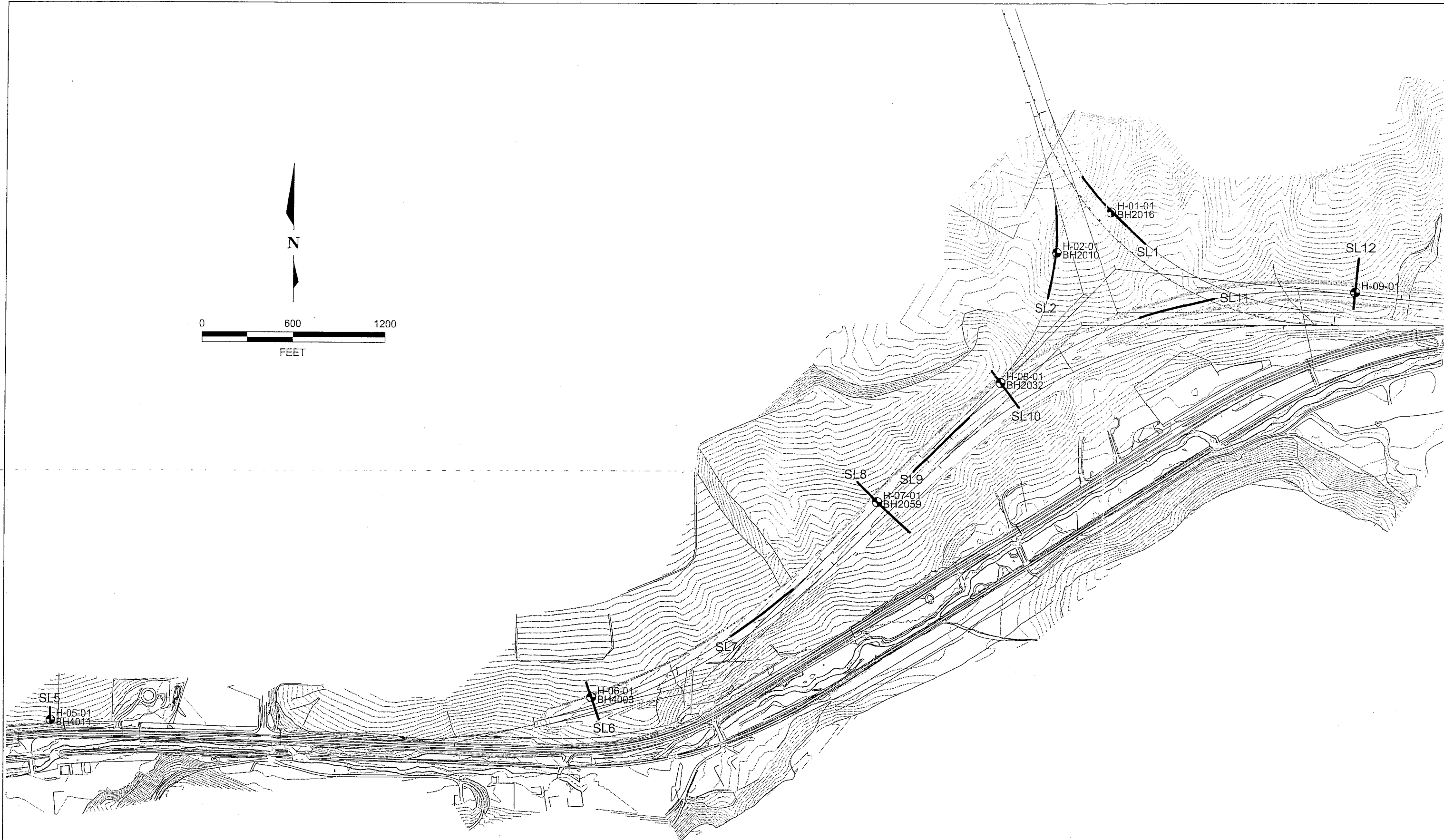


FIGURE **1a**
SITE PLAN

WSDOT/PULLMAN-MOSCOW/WA

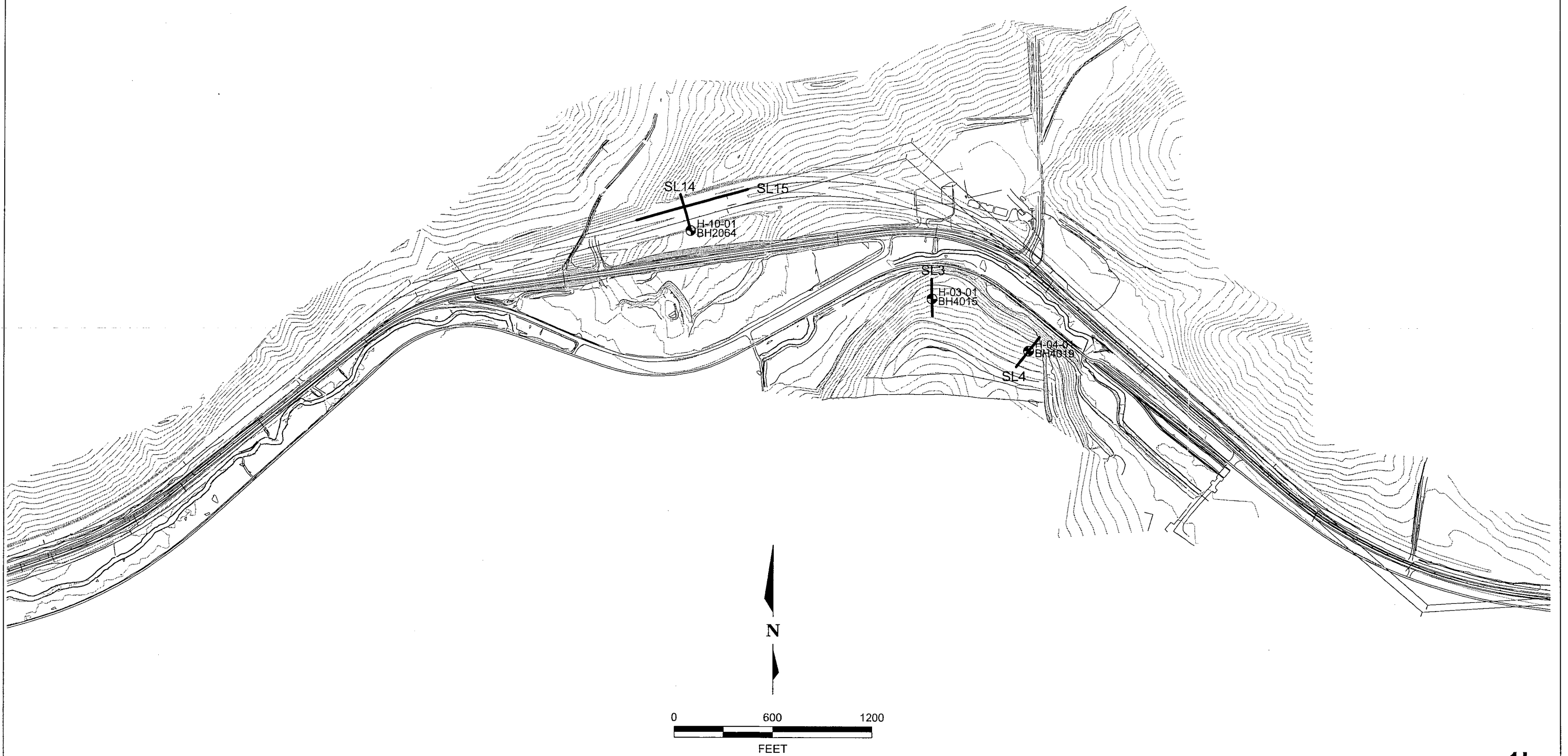
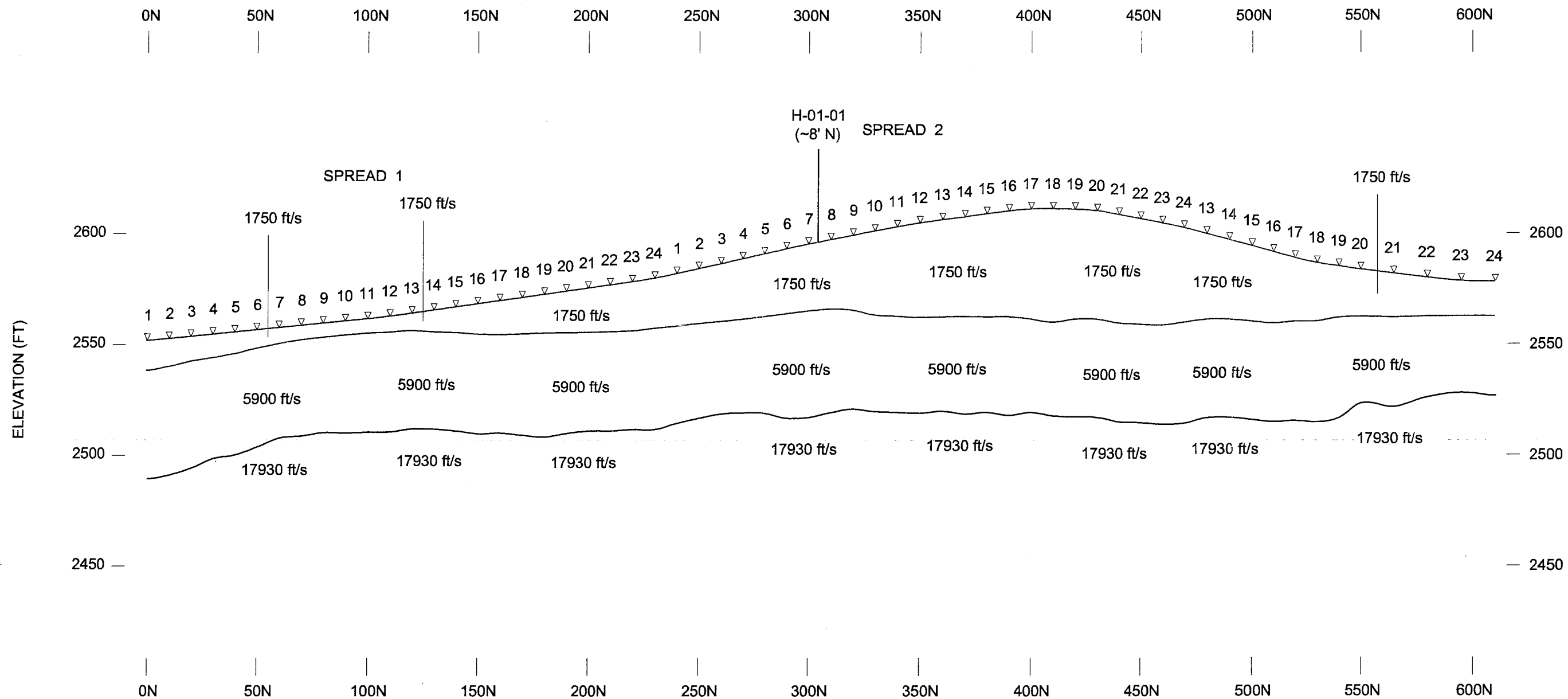
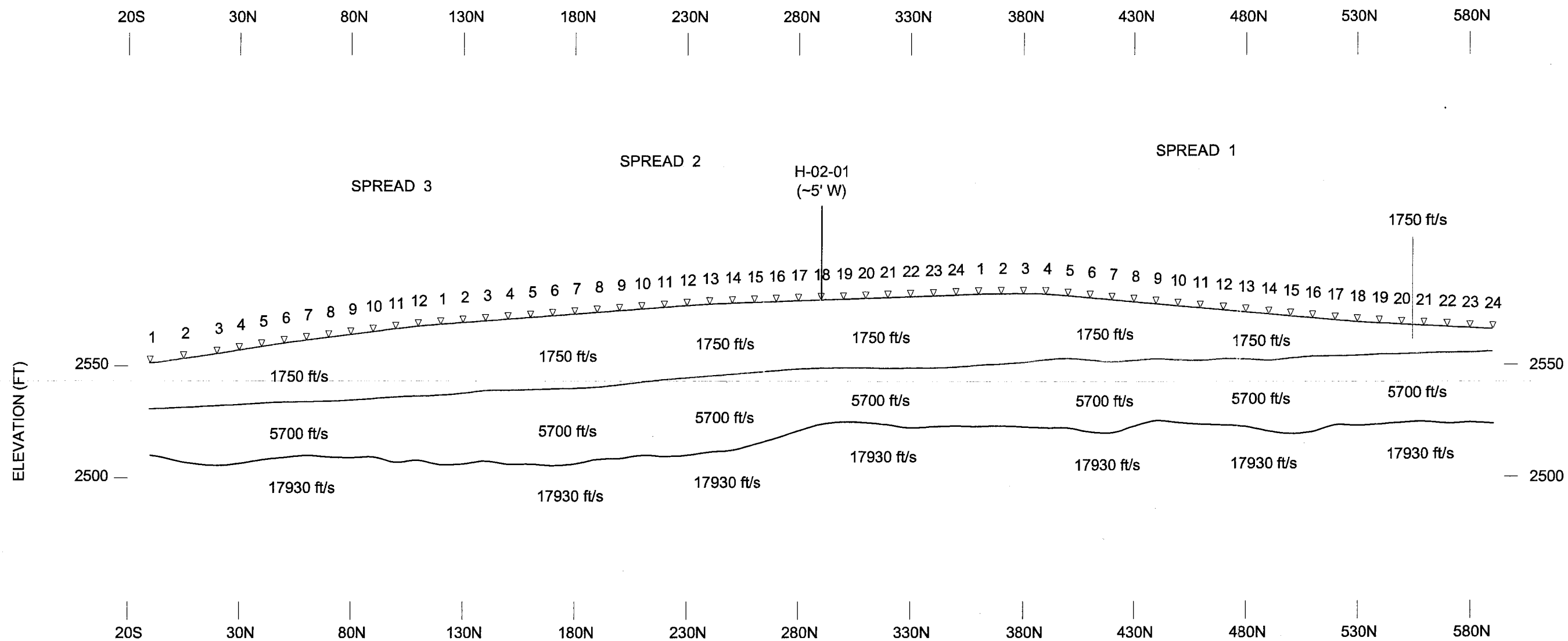


FIGURE **1b**
SITE PLAN
 WSDOT/PULLMAN-MOSCOW/WA



SR270 PULLMAN-MOSCOW SL1

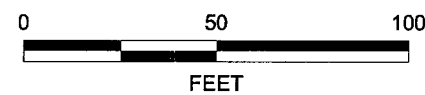
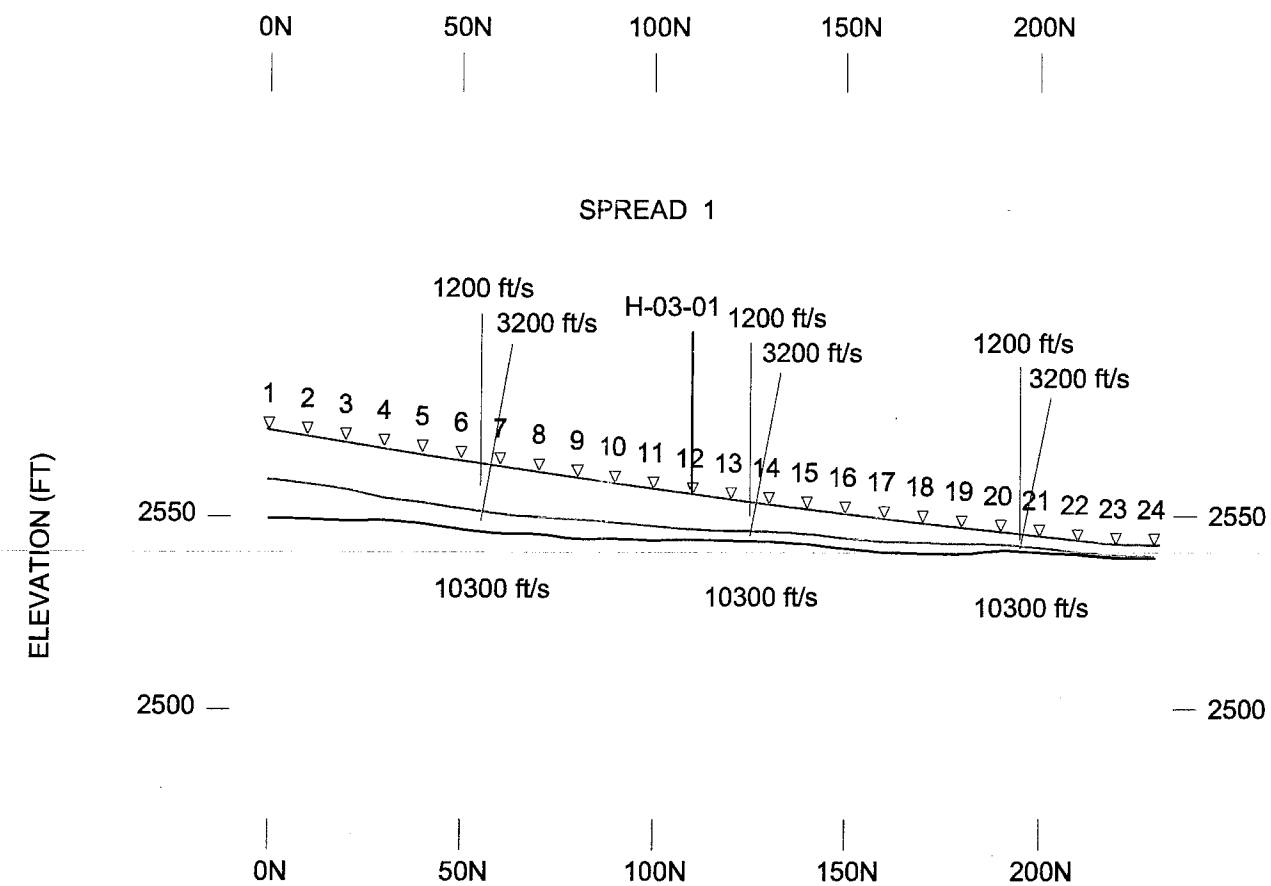
FIGURE 2
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



SR270 PULLMAN-MOSCOW SL2

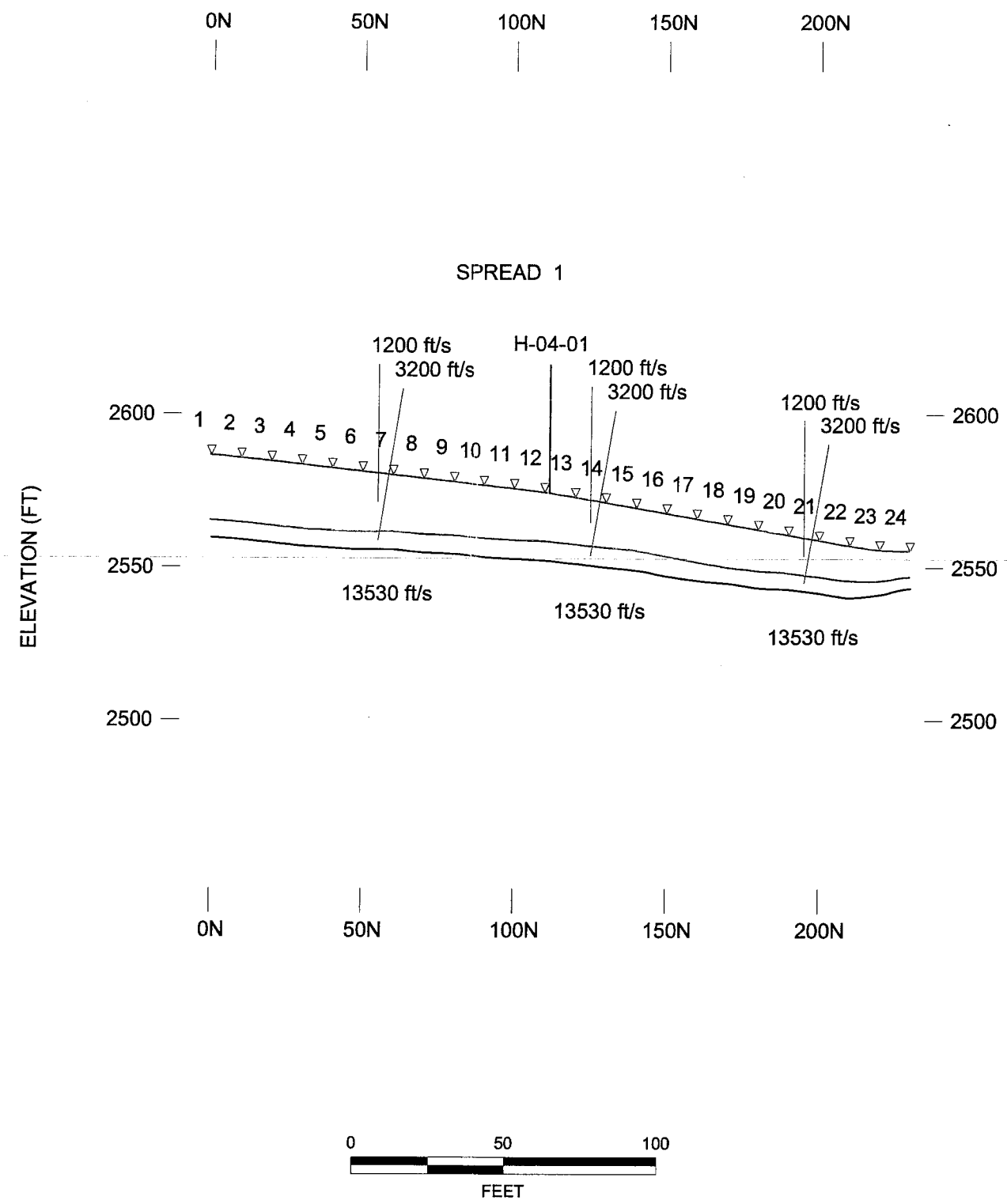
FIGURE 3
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA

Golder Associates



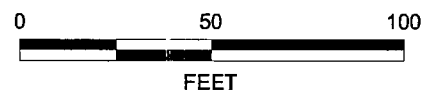
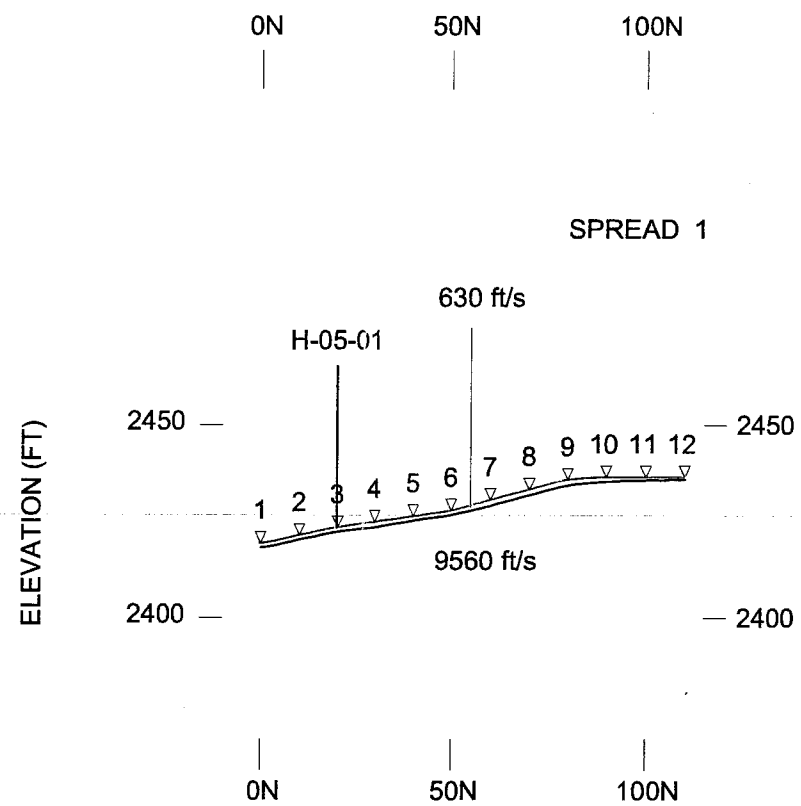
SR270 PULLMAN-MOSCOW SL3

FIGURE 4
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



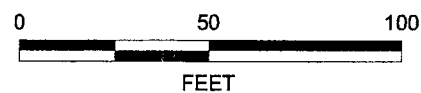
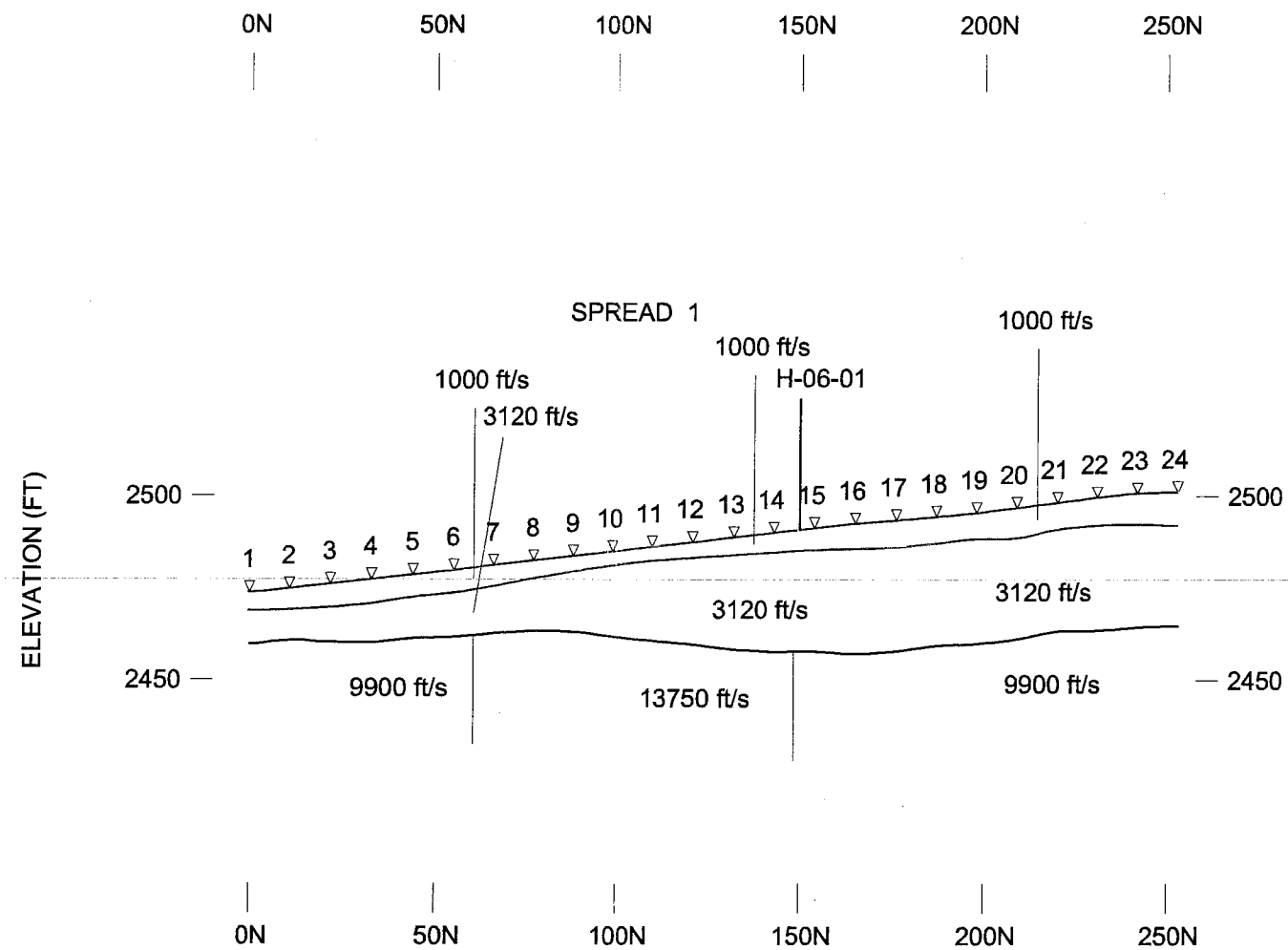
SR270 PULLMAN-MOSCOW SL4

FIGURE 5
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



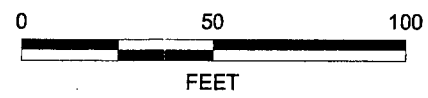
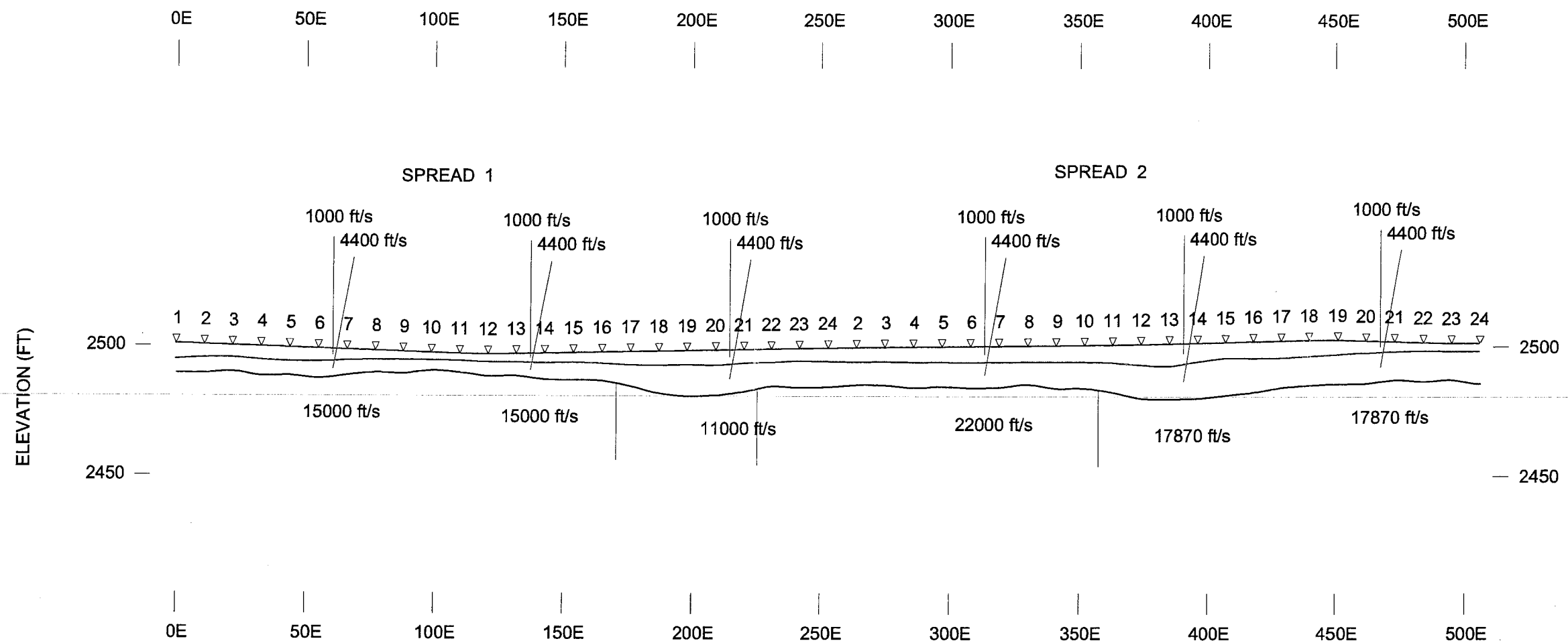
SR270 PULLMAN-MOSCOW SL5

FIGURE 6
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



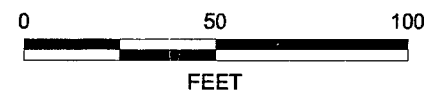
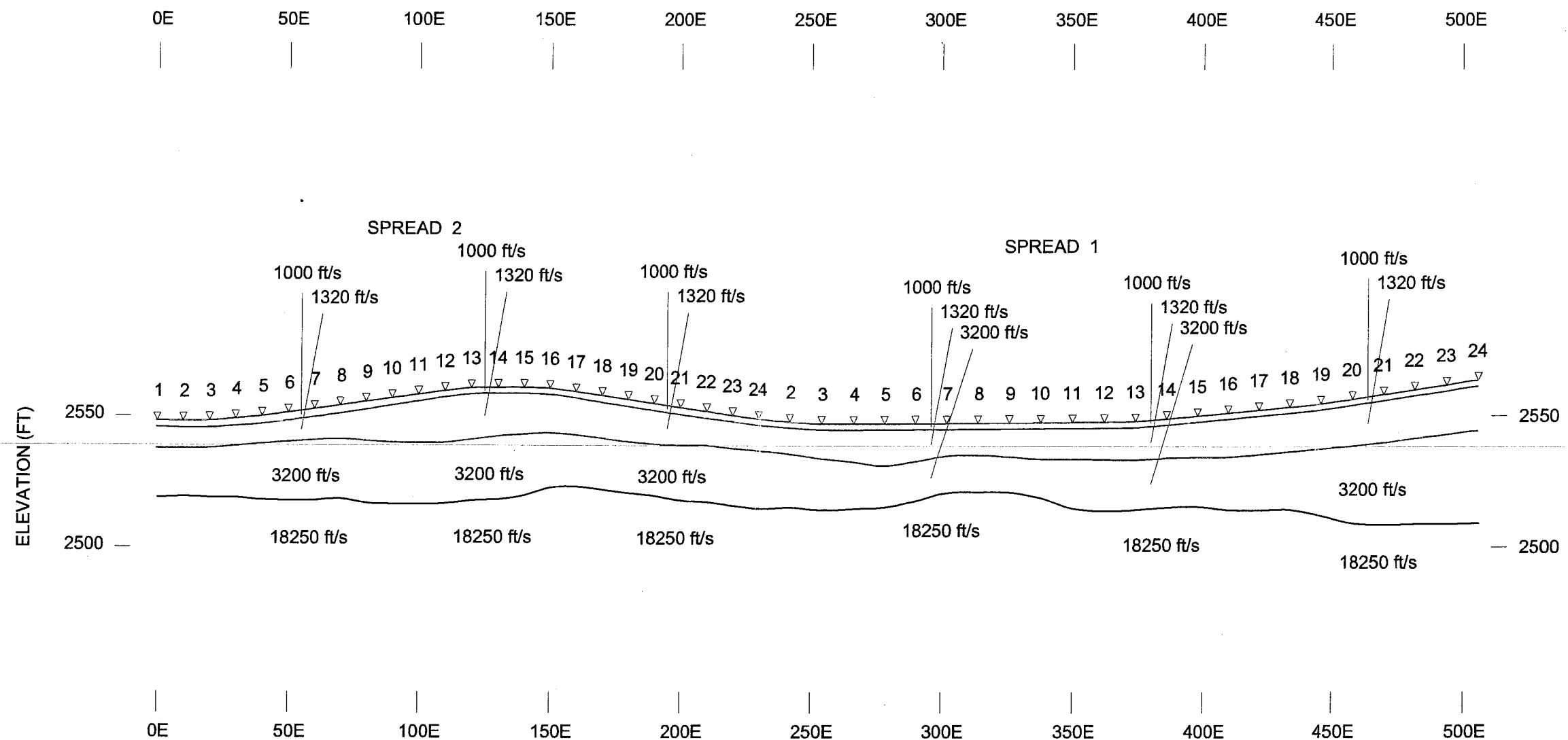
SR270 PULLMAN-MOSCOW SL6

FIGURE 7
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



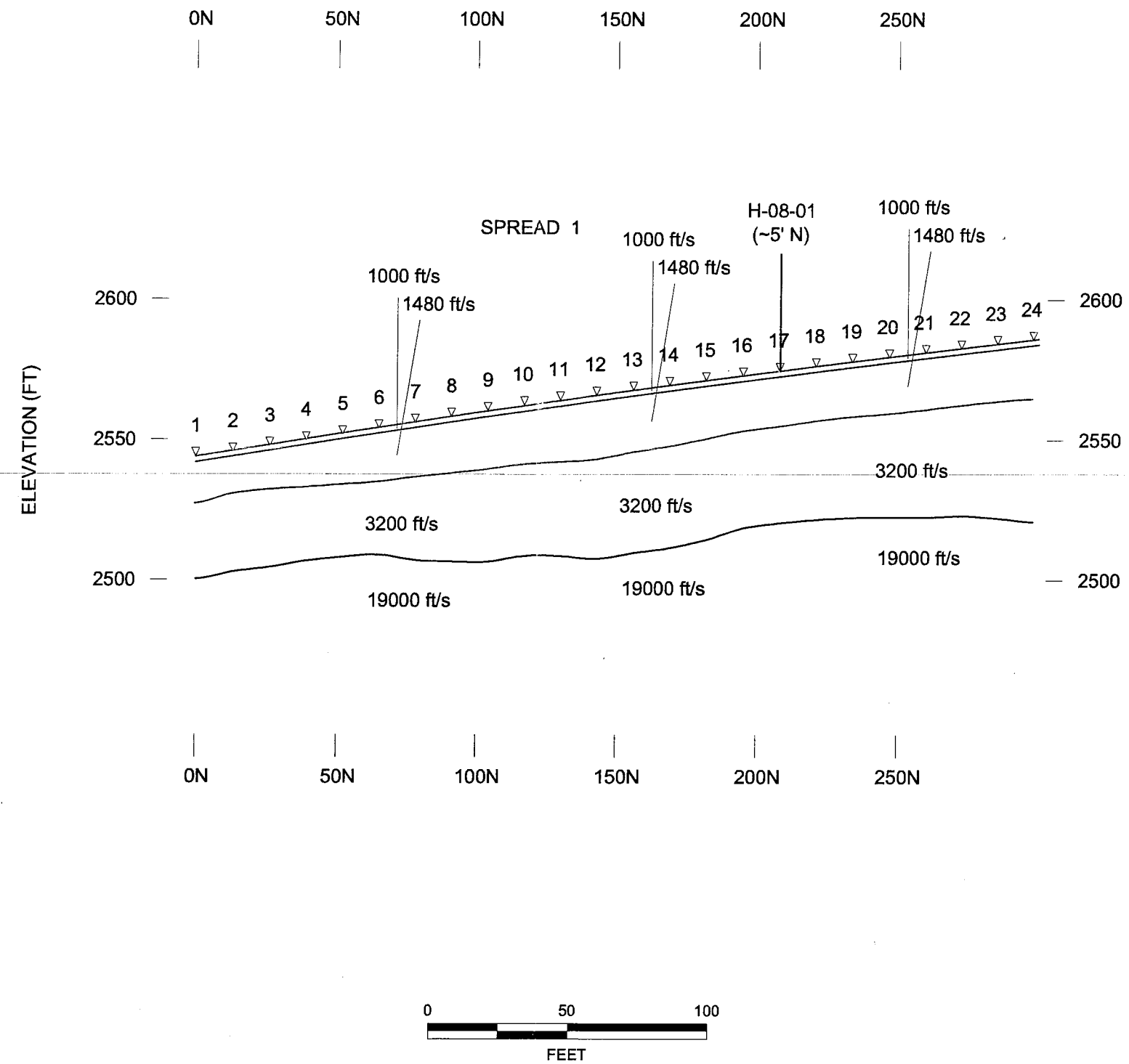
SR270 PULLMAN-MOSCOW SL7

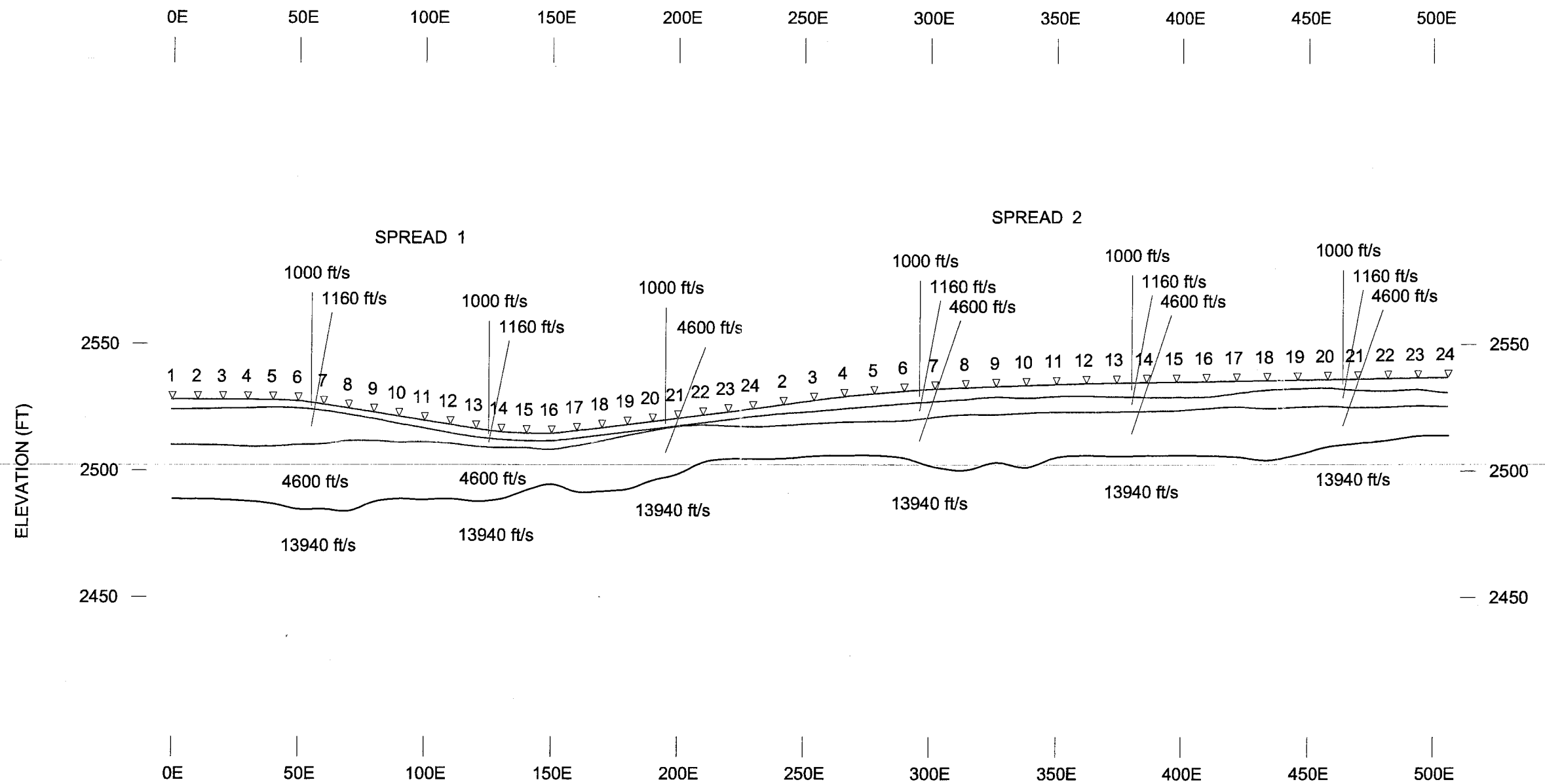
FIGURE 8
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



SR270 PULLMAN-MOSCOW SL9

FIGURE 10
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA

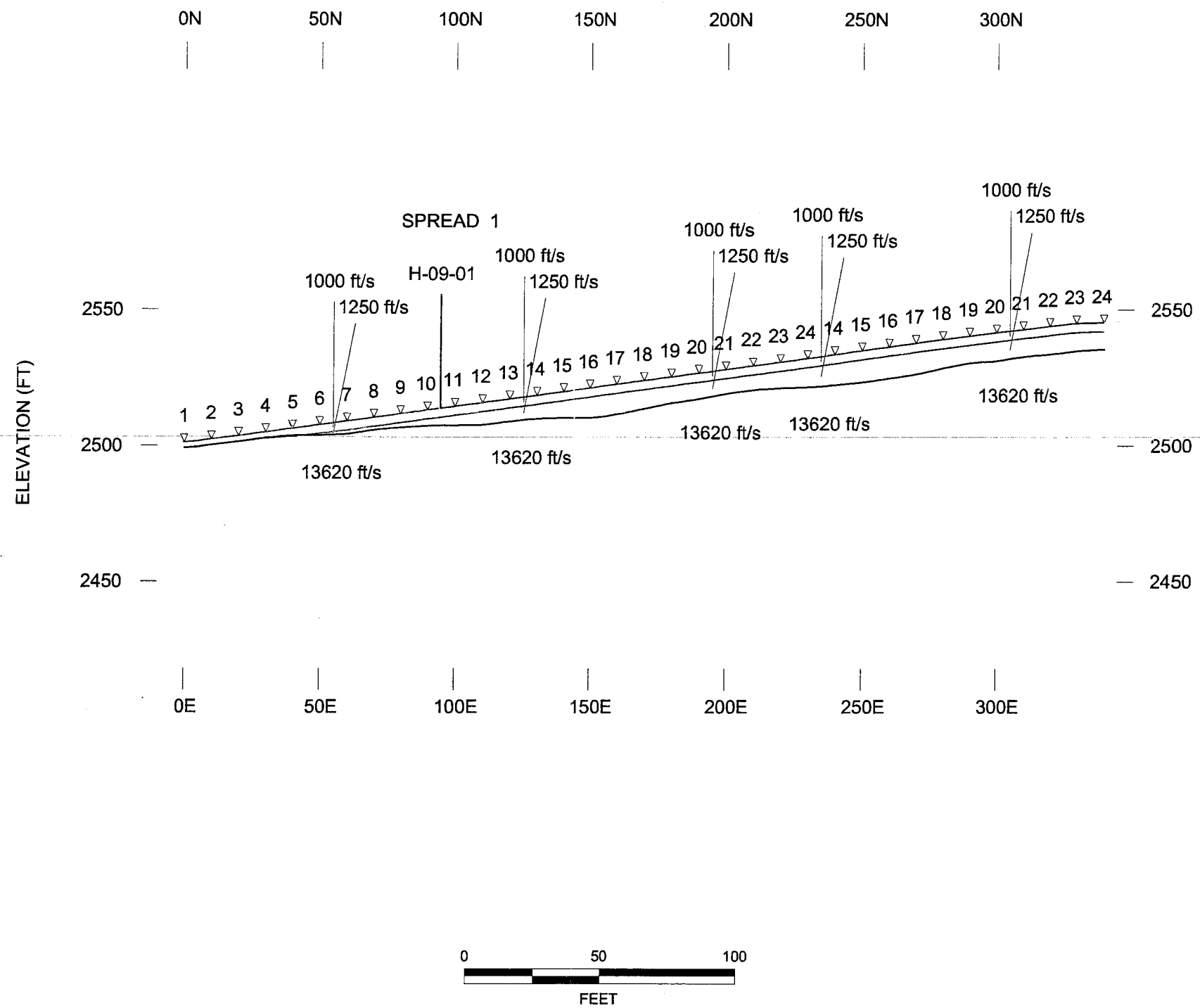




SR270 PULLMAN-MOSCOW SL11

FIGURE 12
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA

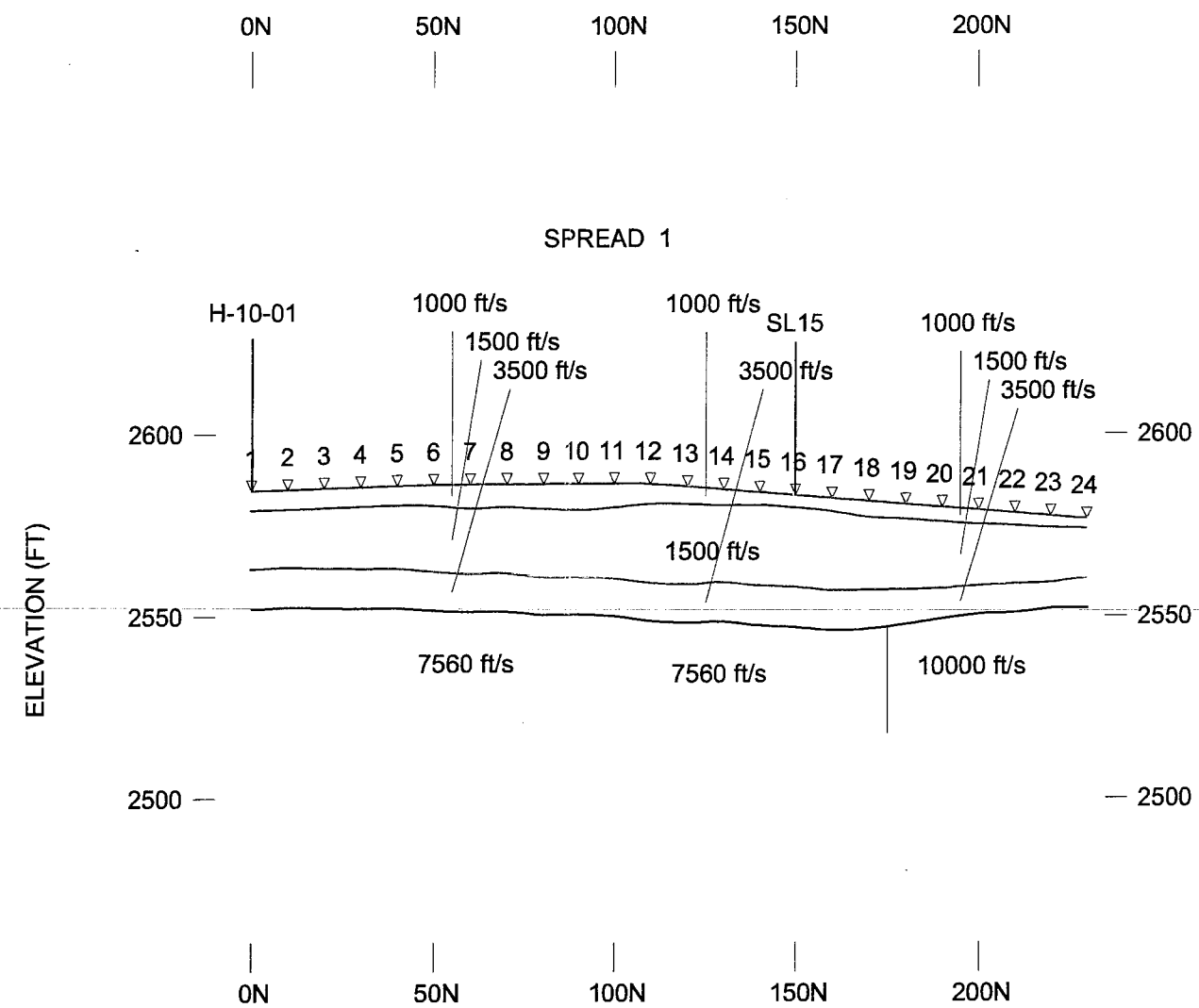
Golder Associates



SR270 PULLMAN-MOSCOW SL12

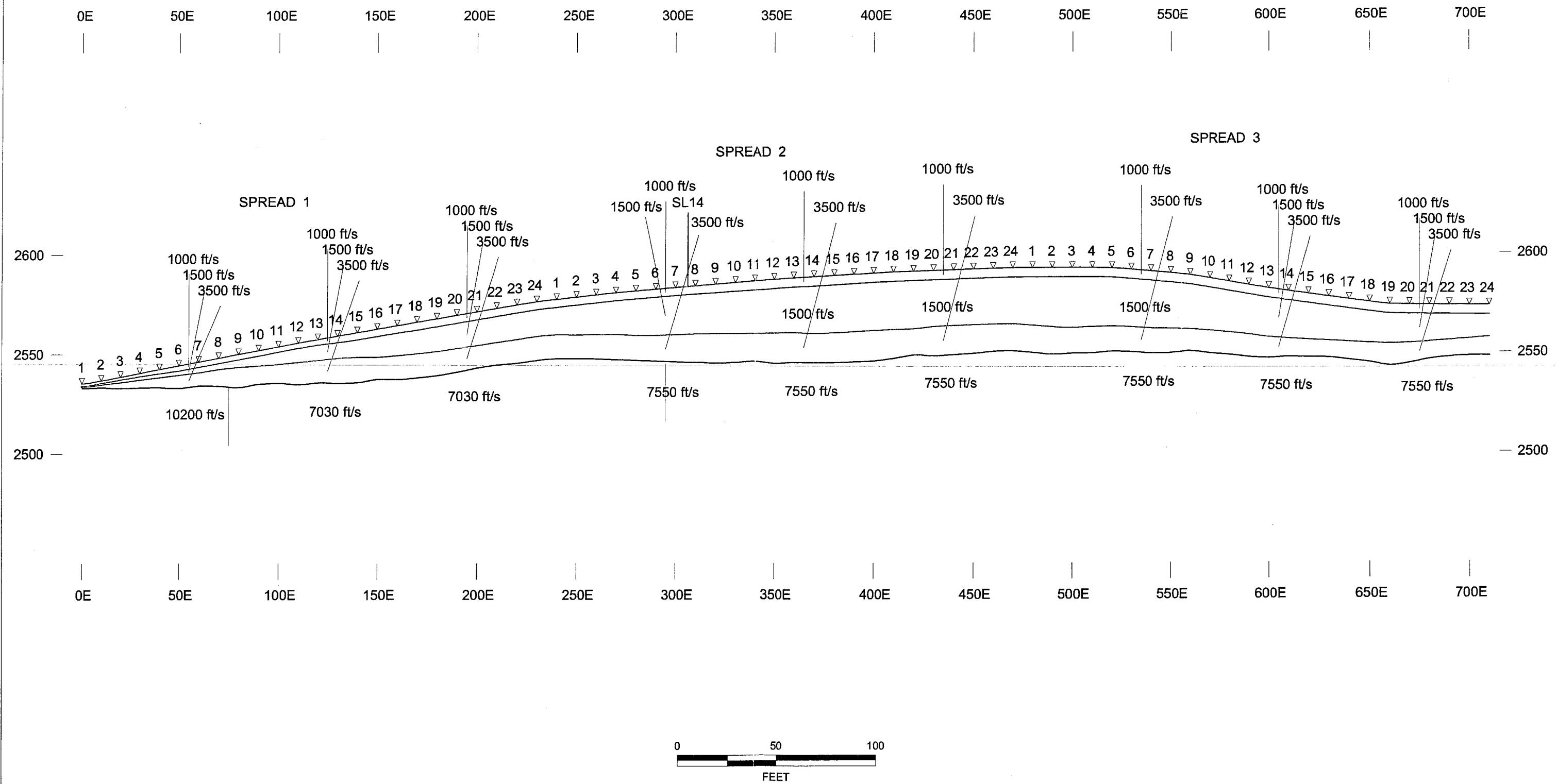
FIGURE 13
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA

Golder Associates



SR270 PULLMAN-MOSCOW SL14

FIGURE 14
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA



SR270 PULLMAN-MOSCOW SL15

FIGURE 15
SEISMIC REFRACTION SURVEY
WSDOT/PULLMAN-MOSCOW/WA